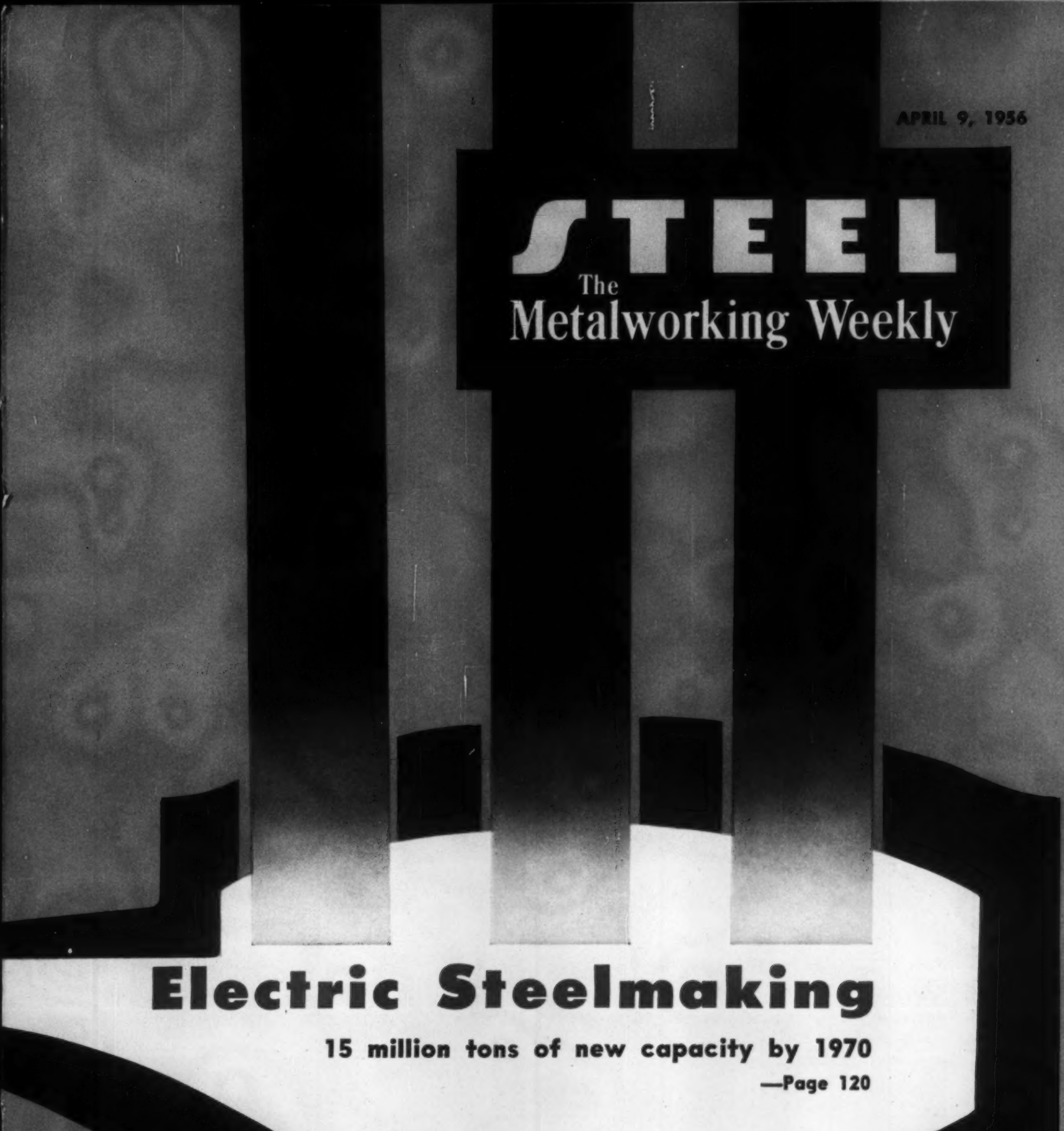
APRIL 9, 1956

STEEL
The
Metalworking Weekly



Electric Steelmaking

15 million tons of new capacity by 1970
—Page 120

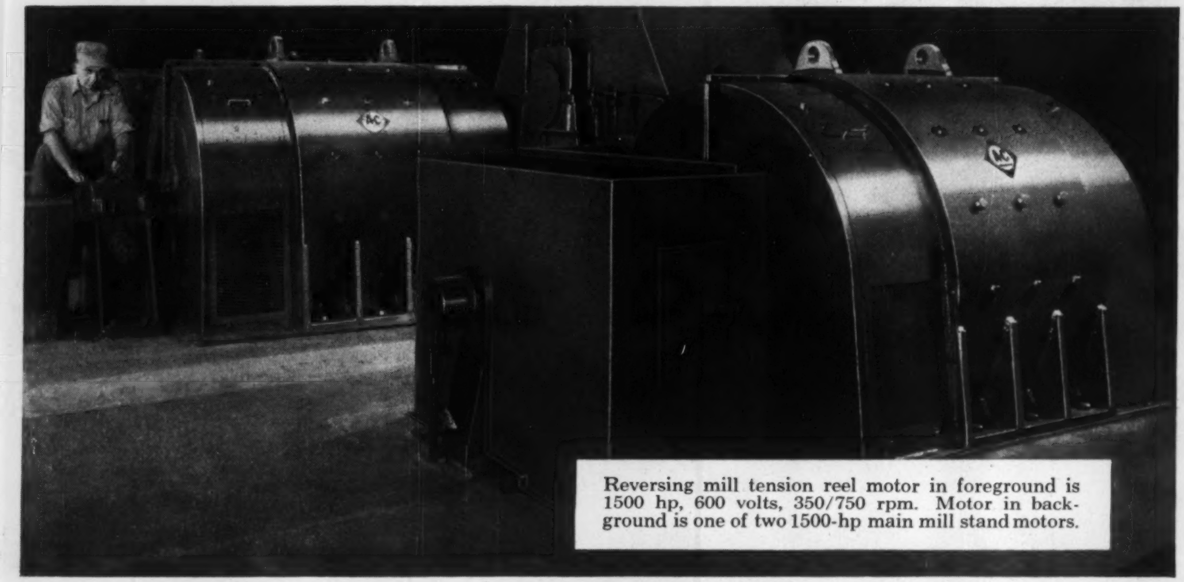
✓Used Appliance Market? . . . page 65

✓Steel Stocks Mount for Autos . . . page 79

CONTENTS—PAGE 5

ALLIS-CHALMERS MOTORS

Furnishing All Drive Power for New Steel Facilities

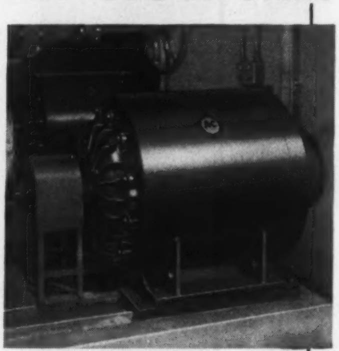


Reversing mill tension reel motor in foreground is 1500 hp, 600 volts, 350/750 rpm. Motor in background is one of two 1500-hp main mill stand motors.

Dependable Allis-Chalmers Motors Play Key Role in Steel Mill Expansion

Expansion recently completed in an eastern steel mill included two new processing lines and a new reversing mill. Allis-Chalmers application-engineered motors furnish dependable, economical drive power for these new specialized steel facilities — helping this major producer attain top steel yield.

For experienced help with *your* expansion or modernization plans, contact your local Allis-Chalmers office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.



Here are Allis-Chalmers 100-hp, tube-type, TEFC explosion-proof cage motors driving pumps in oil room below the reversing mill.

NOW, you get even more winding protection with SILCO-FLEX

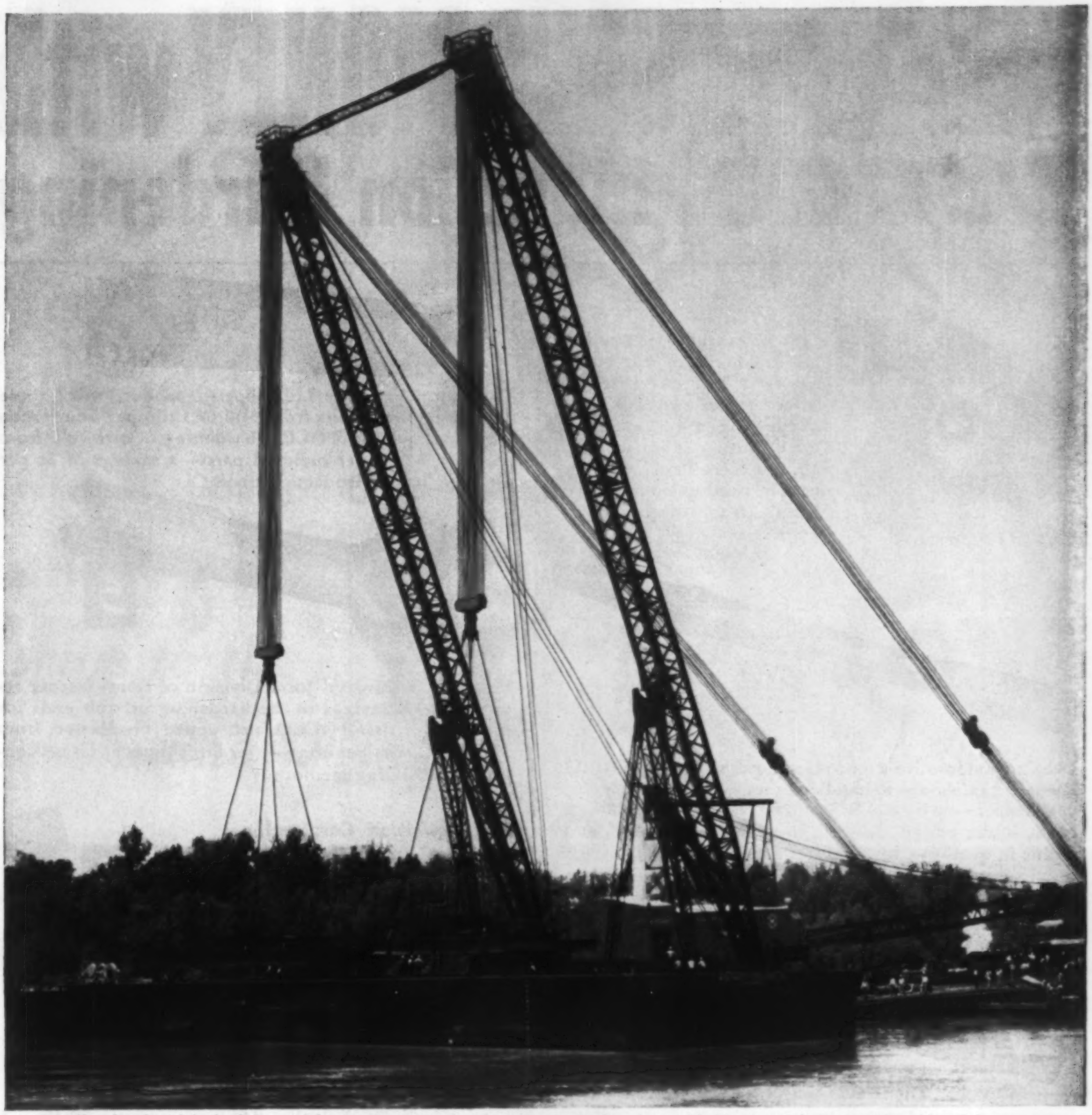
all-silicone-rubber motor insulation, available only on Allis-Chalmers motors — in many of the larger sizes. Ask your A-C representative for the facts about this revolutionary new insulation system.

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5033



Sheerleg derrick built of Mayari R by American Hoist & Derrick Co., St. Paul, and assembled by Avondale Marine Ways, New Orleans.

Mightiest derrick in the world

Quite a rig, this big sheerleg derrick. Built for use in erecting offshore drilling platforms, she's taller than a 20-story building and requires a special 300-ft barge to keep her on an even keel!

And strong? When they tested her muscles recently in the Gulf of Mexico, she hoisted a deadload of 800 tons, setting a new world's record, nearly doubling the previous record by the block-and-fall method!

It is significant that the makers of this giant, American Hoist and Derrick Company, fabricated the sheerlegs from Mayari R high-strength, low-alloy steel. Mayari R is 50 pct stronger than carbon structural steel, five to six times more corrosion-resistant, and fully as weldable. For the full story on Mayari R, write for Catalog 353.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

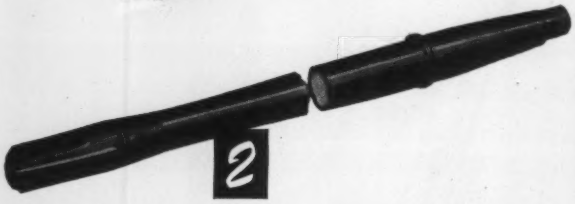
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM
STEEL

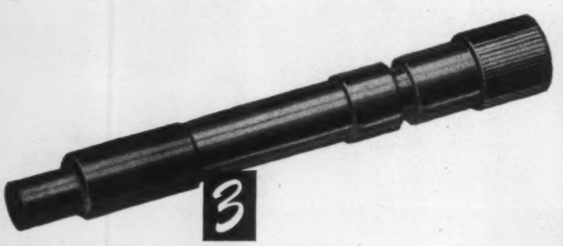
Mayari R...High-Strength, Corrosion-Resisting Steel

7 WAYS to SAVE MONEY with TOCCO* Induction Hardening

Cost was reduced 94% when heat-treatment of this corn-harvester part was changed from carburizing to TOCCO-hardening, 9½c saved on every piece — $4750 on each 50,000 piece batch, plus an hourly production increase from 120 to 300 pieces per hour.

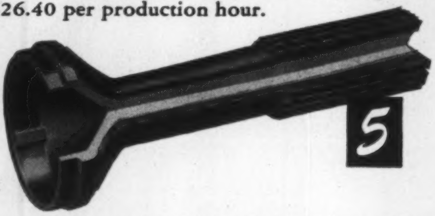


Leading automotive companies need and use TOCCO hardened axle shafts to handle higher horsepower. Better, yet cheaper—savings of $375.00 per day. Less machining costs, lower priced material, increased production, and a plus in quality—200% greater torsional life.



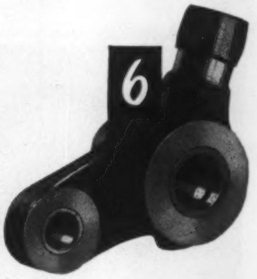
Kearney & Trecker Corp. reduced the cost of hardening this milling machine part from $1.57 to 10c apiece. In addition TOCCO made possible a switch from alloy to S.A.E. 1045 steel—saving another 11c per piece in material cost. Kearney & Trecker hardens 140 different parts on one TOCCO unit.

Thompson Products Ltd. boosted production of these automotive wrist pins from 500 to 1200 per hour when they switched to TOCCO-hardening. Costs fell from $5.45 to $3.25 per hundred parts—a savings of 2c per pin, $26.40 per production hour.



Mechanics Universal Joint Division of Borg-Warner reports a 69% savings in the hardening of stub ends for propeller shafts. TOCCO also upped production from 35 to 112 parts per hour—over three times as fast as conventional heating methods.

Lima-Hamilton Corporation adopted TOCCO for hardening this shifting lever. Results: a savings of 4c per piece—$25 per production hour. TOCCO costs only 17% of former heating method. This is only 1 of 139 parts TOCCO-hardened by Lima-Hamilton Corp. All show savings over usual heating methods.



7

Number 7—the lucky number—is up to you. Why not add your name to the list of companies who use TOCCO Induction Heating to increase production, improve products and lower costs. TOCCO engineers are ready to survey your plant for similar cost-saving results—without obligation, of course.

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TOCCO
JUST PUSH A BUTTON

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NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-4, Cleveland 1, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

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Company____________________
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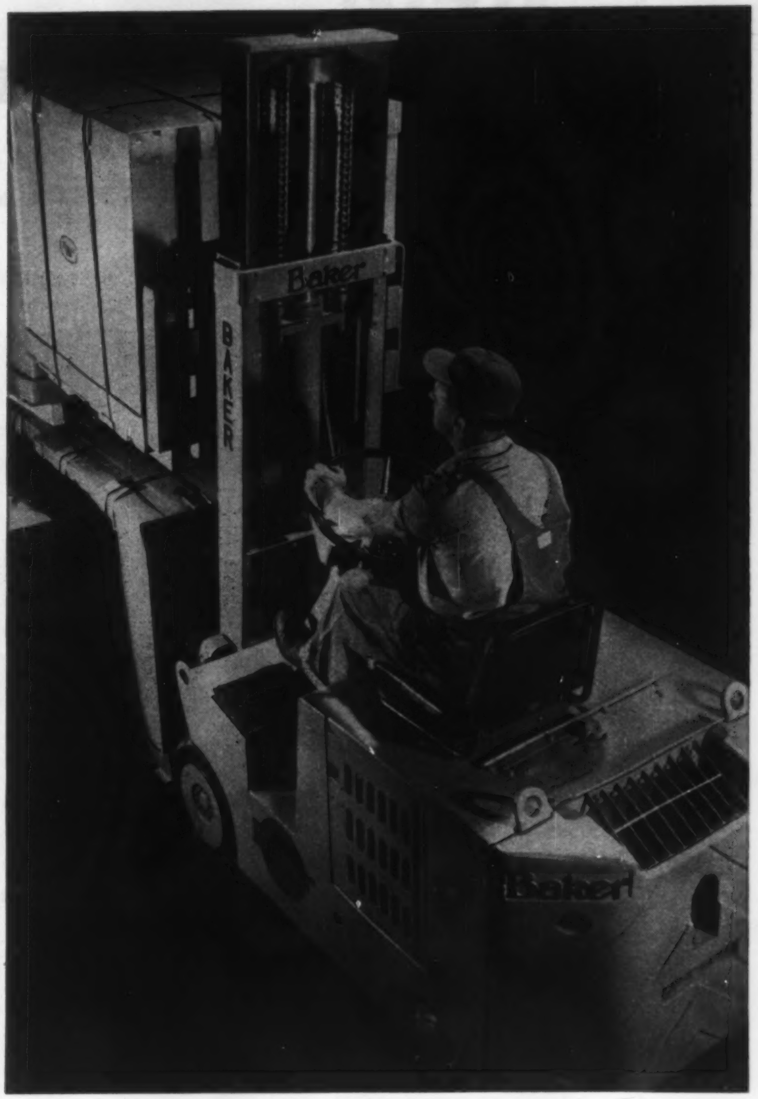
the gas fork truck that makes the fewest and shortest trips to the maintenance shop...

BAKER "FG"



Industrial trucks "out-of-service" mean dollars down the drain... not only repair dollars, but even more dollars for lost work. That's why we loaded the Baker "FG" gas trucks with features that mean substantially more time on the job. Here are a few:

Heavy-duty industrial truck engine operates at optimum RPM for least strain and abuse. Pistons are balanced to grams instead of ounces, crankshaft to 4 inch-ounces, connecting rods to 2 grams. Compact, rigid "power train" requires no troublesome universal joints. Clutch housing is split for better accessibility. Single oil supply lubricates entire assembly. Large full-floating, self-equalizing, self-energizing brakes have single-point adjustment.

Baker "FG" gas fork trucks, available in 3000, 4000, 5000 and 6000 pound capacities, are the only gas trucks with a full 6-months' warranty... an added assurance. Write for specific bulletins.

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handling equipment

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Except when it's Locked!
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Designed for panel mounting where remote indication is required, this electrically operated counter is a compact package 5.5″ long, 2.1″ wide, 2.7″ high. Capacity: 1,000 counts per minute. Power consumption, 8 watts. Stocked in 110 and 220 AC and DC. Easy to reset, except when locked . . . then the sturdy tumbler-lock* puts the damper on tampering. Yet one turn of the key resets all 6 figures to zeros.

This new Magnetic Counter is one of the thousands of Veeder-Root standard and special counters . . . electrically, mechanically and manually operated . . . in daily use throughout the world in industry, business, science and medicine. You, too, can count on Veeder-Root . . . to help you count anything you need.

*National Lock Co. Lock No. 68-4837; Key D-428

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STEEL
The Metalworking Weekly

APRIL 9, 1956
Vol. 138 No. 15

METALWORKING OUTLOOK, 59

The Editor's Views, 63
What Price Used Appliance Market? 65
Some outlets push the idea, others scoff
Management at Work, 75
AMF's Gott: Mergers his specialty
Conveyors Carry On, 67
Machine Tools: Dilemma on Capitol Hill, 68
Engineers Fight Corrosion, 69
Clutch, Converter Sales Climb, 70
Abrasive Wheels: Research Pays Off, 71
Office Engineering Cuts Salary Costs, 76
Yale & Towne Predicts Boom for Fork Lift Trucks, 77

Windows of Washington, 72
Mirrors of Motordom, 79
The Business Trend, 83
Men of Industry, 87
New Products, 143
Behind the Scenes, 6
Letters to the Editors, 10
Calendar of Meetings, 23
Progress in Steelmaking, 120
New Literature, 158

TECHNICAL OUTLOOK, 111

Taming Supersonic Heat, 112
New materials for missiles
Porcelain: Put It on Electrostatically, 115
Whirling disc supplies the coating
Build Corrosion Resistance Into Stainless, 116
Improper fabrication cancels out quality
Tailored Tools Meet Schedules, 132
Special tooling speeds aircraft production
Spray Pickling Brass Strip, 134
Method is fast and neat, results uniform
Shaving Process Keeps Gears in Mesh, 118
Cast-In Thread Inserts Anchor Costs, 128
Flow Speeded with Lift-Truck-Size Tote Boxes, 130

MARKET OUTLOOK, 161

Steel Operations, 161
Price Comparisons, 162
Nonferrous Roundup, 164
Nonferrous Prices, 166
Steel Prices, begin 168
Scrap Prices, 186

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what's the scoop?

it's SEYMOUR NICKEL SILVER

of course!

Take a close look at one of the "scoops" — or hooks — in the slide fasteners which play a key role in your daily living.

The *best* slide fastener scoops are made of Seymour Nickel Silver flat wire. They are formed on high speed machines that produce up to 300,000,000 of these tiny parts every day. Yet, so precise is the operation that tolerances are held to half-thousandths of an inch!

Because its uniform composition and temper enable it to undergo precise forming on high speed machines, Seymour Nickel Silver meets these requirements perfectly. It will not discolor materials — it is long wearing and corrosion resistant — it has the necessary eye appeal. Best of all, it has the *natural lubricity* which makes fasteners work smoothly and without sticking. These enviable qualities have helped make Seymour the leading supplier of nickel silver wire for the slide fastener industry.

Beyond that, Seymour's readiness to produce nickel silver alloys in strict conformity to users' needs has prompted many manufacturers to say . . . "SPECIFY SEYMOUR — You KNOW it's good!"

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behind the scenes

Brant on Brazing

Not too many years ago, when Assistant Editor Austin Brant was enclosed by the mountains of his native West Virginia, he didn't know the difference between salt bath and induction brazing. He was aware that the words brazier, brassiere, brazen and brazing carried different meanings, but at least three of these words didn't interest him. So long as he could beat his gee-tar and utter mournful howls, Austin didn't care if metal parts were joined by brazing processes or thought control.

"Time," said Austin, "marched on. One day I found myself digging up some material for a cover story. It was about brazing. Well, sir, everybody who knew anything about brazing began sending in information, and before long I had enough stuff to write a book.

"The first story ran last week. Did you notice it?"

Of course, we noticed it. The cover suggested an enlarged fragment of the fruit salad worn on the breasts of military heroes; indeed, it bore a striking resemblance to the ribbon bar of the Good Conduct Medal, with two clusters of heat waves. We noticed the story, too: "BRAZING . . . Production uses boom as industry takes new look at this veteran."

It was a remarkably factual story, explaining in detail why the successful wartime experience of some manufacturers and the present need for fast, efficient and economical joining methods have forced brazing to the front.

"We're going to run the whole story in a series," Austin declared with some excitement. "Well, not the *whole* story. I came across tales of high temperature stainless steel brazing, and other classified uses, and, man, when you run into that old security wall, and stir up them military watchdogs, it makes you wish you were hiding out in West Virginia!"

The metalworking world will be glad that Austin isn't hiding out—because now that he is in full cry on the brazing trail, we can't let him out of our sight until the series is completed.

Old Scratch on the Run

An interesting side note on our burgeoning economy is the declining position of Old Scratch. The American Iron & Steel Institute reveals that churches are springing up throughout the U. S. at a rate exceeding the wildest dreams of any given evangelist. Old Scratch has been on the run now for the past ten years. During that period, church construction has increased ten times, and the boom shows no sign of backsliding. Indeed, within the next ten years, the institute reports, an estimated 70,000 new churches will be built at a cost of $7 billion.

The expanded church building program was attributed to the rapid growth of decentralized suburban communities, the general rise in population and the resurgence of religious interest.

See You Later, Alligator

Larimore Clayton Lightburn ran an alligator farm, and it was surprising how many of these reptiles he sold to persons who were interested in improving the breed. His two star salesmen, Rudolph and Rantool, enjoyed a brisk week early in the month. Rudolph sold $3893.93 worth, while Rantool sold $8311.19 worth.

"Splendid!" ejaculated Larimore, rubbing his hands, when a secretary brought him a memorandum on gross sales. "Divide that out for me, and let me know how many alligators Rudolph sold."

"What does an alligator sell for?" asked the secretary.

"That's for me to know, and you to find out," retorted Larimore, who fancied himself quite a wag.

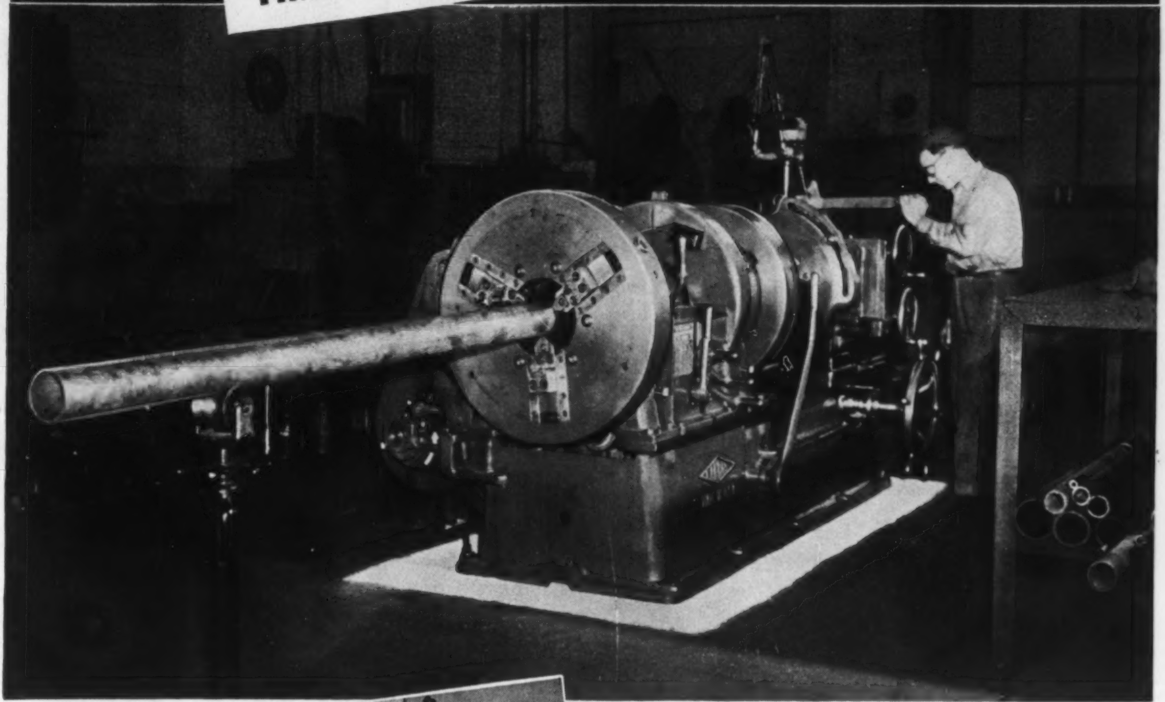
So, the secretary found the answer without looking up the price. Can you?

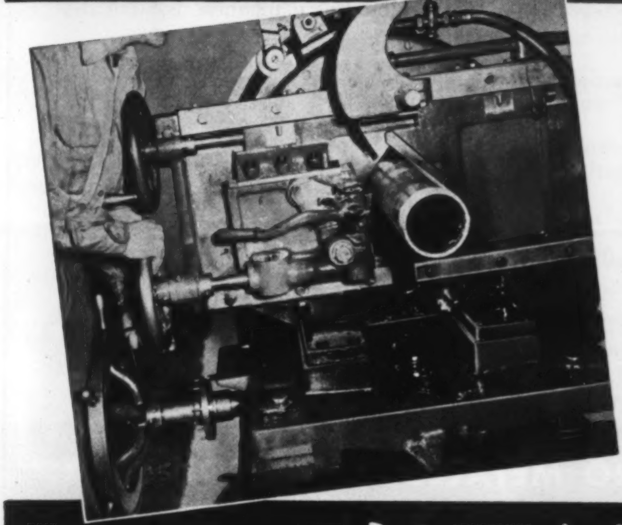
Shrdlu

(Metalworking Outlook—Page 59)

VERSATILITY

Saves TIME & MONEY *in Maintenance Shops*





Photographs show a Landis Pipe Threading Machine installation in a Job Shop of the New York Central Railroad. This shop, located at Weehawken, New Jersey, operates as a Marine Repair Shop handling maintenance for tugs, barges, lighters, etc. Illustrations show wrought iron pipe being cut off after reaming and threading. Standard pipe threads are cut 1 ½" long on the 4" pipe, using a cutting speed of 25 surface feet per minute. This machine is also used for cutting boiler tubes to length.

The wide diametrical range of the die heads and the use of patented tangential pipe chasers gives these machines a versatility invaluable in maintenance work. For example, the 6" Landis Pipe Threading Machine illustrated threads all pipe sizes from 1" to 6", inclusive. Size adjustment of the die head is simple and quick. Chasers need not be changed except for threads of a different pitch, form, or taper. Chasers are interchangeable and need only be replaced singly as needed. Tangential cutting action reduces wear, and chasers can be reground to use over 80% of their length. Write for Bulletin C-61.

LANDIS *Machine* COMPANY

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- **Simplex low-carbon ferrochrome**—chromium 63 to 66%, carbon max. 0.010% or 0.025%.
- **Low-carbon ferrochrome**—chromium 67 to 71%, ten carbon grades from 0.02 to 2% max.
- **Medium-carbon ferrochrome**—chromium 66 to 70%, carbon 2.25 to 3%.
- **High-carbon ferrochrome**—chromium 65 to 70%, five carbon grades from 4.5 to 7%.
- **Low-chromium, high-carbon ferrochrome**—chromium 57 to 64%, carbon 3.5 to 5%.
- **"EM" ferrochrome-silicon**—chromium 39 to 41%, silicon 42 to 45%, carbon max. 0.05%.

for NITROGEN ADDITIONS

- **Simplex nitrogen-bearing, low-carbon ferrochrome**—in 2% and 5% nitrogen grades.
- **Nitrogen-bearing, low-carbon ferrochrome**—chromium 65 to 70%, in 0.75%, 1.25%, and 2% nitrogen grades.
- **Nitrogen-bearing, electrolytic manganese metal**—containing approximately 93% manganese (metallic basis) and 6% nitrogen.

for MANGANESE

- **Electrolytic manganese metal**—with minimum manganese content, on a metallic basis, of 99.9%.
- **Low-carbon ferromanganese**—manganese 85% to 90%, six carbon grades from 0.07 to 0.50% max.
- **Mansiloy alloy**—manganese 60 to 63%, silicon 28 to 31%, max. 0.07% carbon.

for additional information

Please contact the nearest Electromet office. Ask for Electromet's new 4-page brochure on electrolytic manganese and the booklets on melting low-carbon stainless steel.

"Electromet," "EM," "Mansiloy," and "Simplex" are registered trade-marks of Union Carbide and Carbon Corporation.

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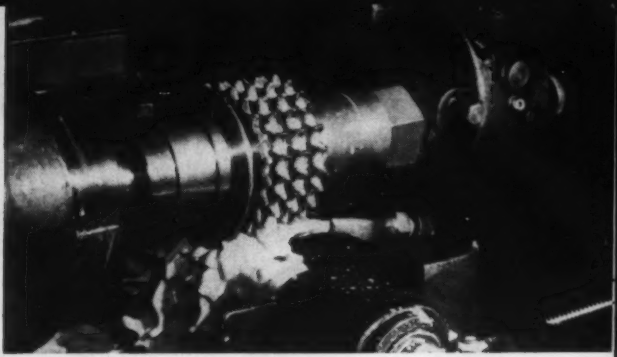
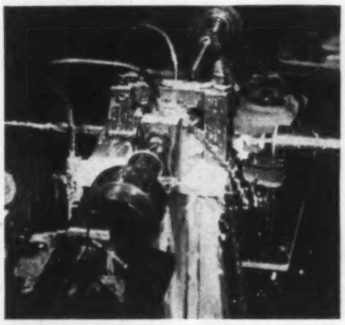


HOBBING. Flooding the cutting edges of a high-speed-steel hob working 1117 steel, S.E.C.O. provides lubricity and cooling power needed for long tool life.

CENTERLESS GRINDING. In grinding 4320 H steel pins. S.E.C.O. keeps wheels clean. Grinding dirt drops out quickly...is not recirculated. Parts are rust-protected.

SUNOCO EMULSIFYING CUTTING OIL HANDLES 4 TOUGH JOBS...EASILY



DRILLING AND REAMING. On steel forgings with a 350/400 Brinell, S.E.C.O. keeps drills cool...gives clean cutting.

Whether you are shaping, hobbing, grinding, reaming, boring or milling, it will pay you to look into the advantages of SUNOCO EMULSIFYING CUTTING OIL.

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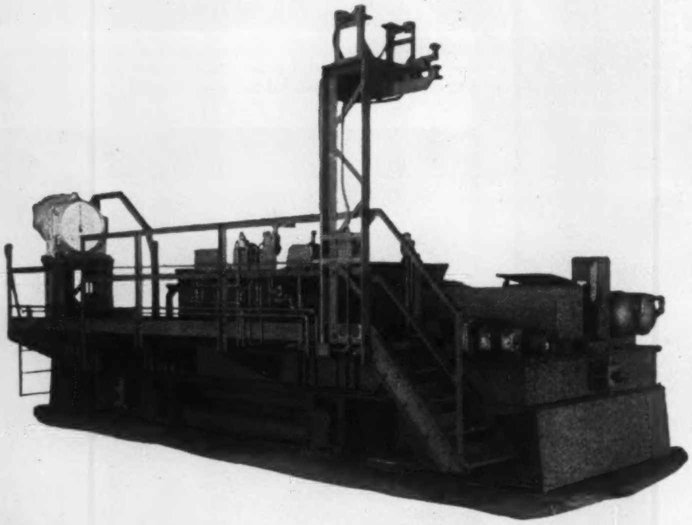
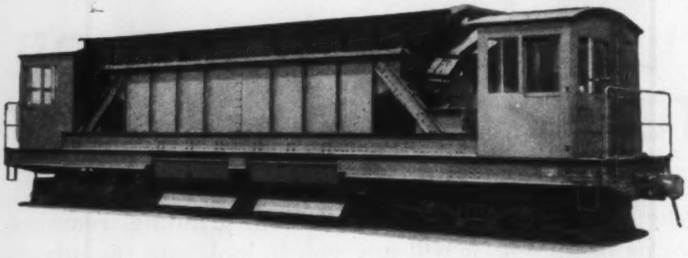
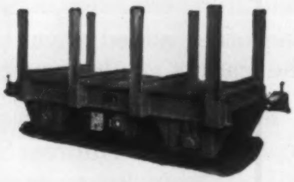


10-TON SCALE CAR, SINGLE HOPPER, BOTTOM DUMP



75-TON ORE TRANSFER, GABLE BOTTOM, SIDE DUMP



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LETTERS
TO THE EDITORS

Brazing: A Production Tool

The article, "Brazing Catches Up" (Mar. 26, page 127), is excellent and will do a great deal to extend use of this process as a production tool. We would like reprints for use in sales manuals.

A. J. Murphy
Advertising Manager
Coast Metals Inc.
Little Ferry, N. J.

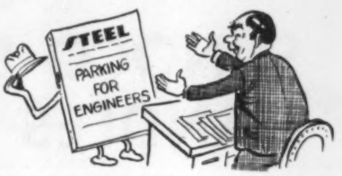
We were pleased with your handling of the Selas type of machine brazing in your article. Beyond our own contribution, however, we find this first article in your series to be a helpful roundup of the over-all situation of brazing as a production technique. To make sure that all affected personnel at Selas are familiar with this material, please send us a half dozen tear sheets of this article.

Howard Mehr
Public Relations & Promotion Department
Selas Corp. of America
Dresher, Pa.

Your article reached our office this morning. You've done a fine job of covering the field—according to our "authorities" here.

W. Ross
Advertising & Sales Promotion
Industrial Heating Department
General Electric Co.
Shelbyville, Ind.

Information on Parking



In your article, "Unrest Among Engineers" (Dec. 26, page 29), reference was made to a Chicago company which gained employee satisfaction through the extension of additional parking privileges.

We are making a study of parking facilities and their significance to employees. We would appreciate additional details of the situation, such as: How many people and parking places were involved? What specifically were the parking privileges granted? What parking facilities, if any, were available before the privileges were granted?

E. J. Reiner
E. of M. Personnel Development Committee
Department 7301
Western Electric Co. Inc.
Hawthorne Works
Chicago

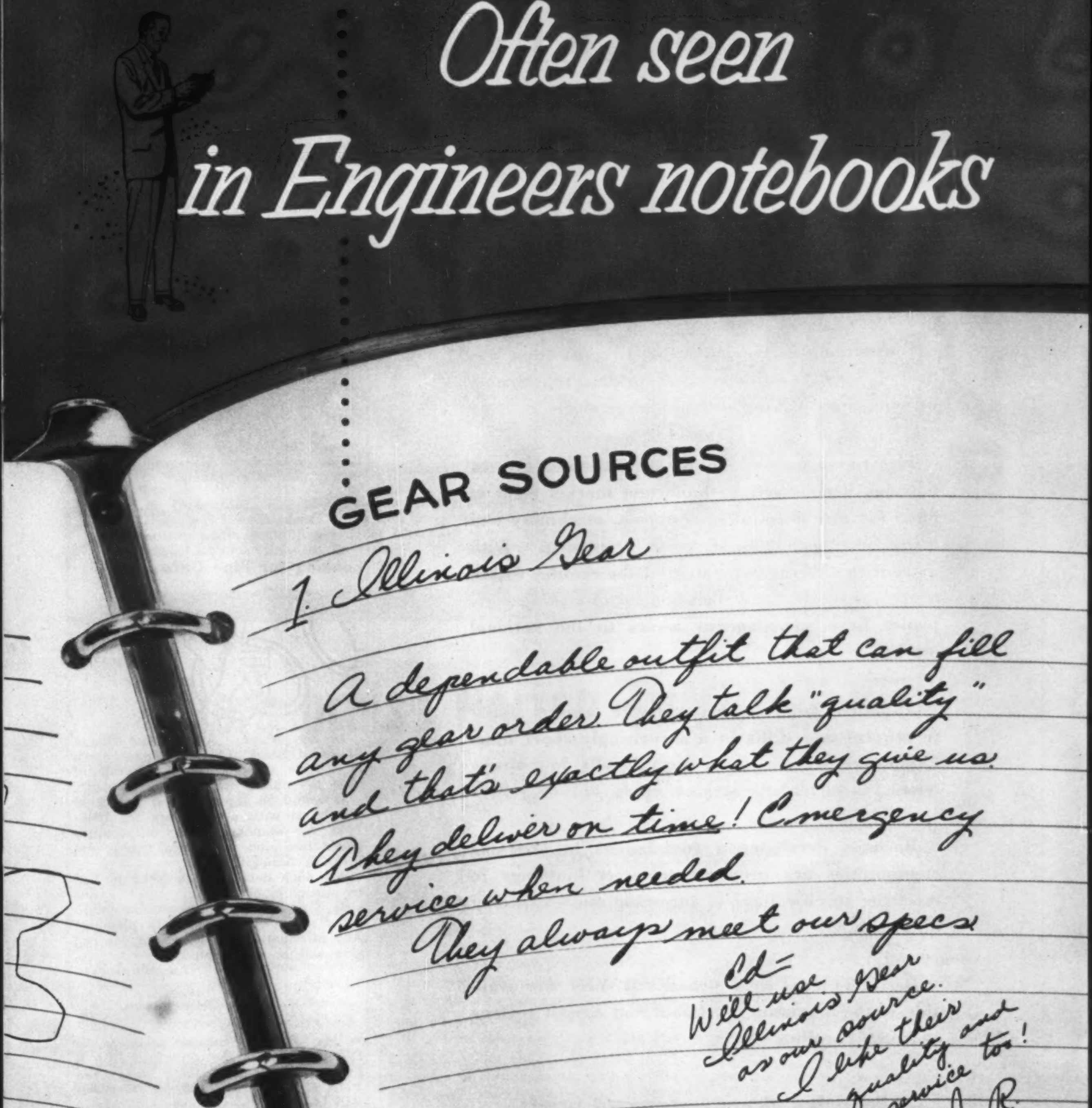
• *We obtained the information on the Chicago company on a confidential basis. We cannot reveal its name.*

We understand, however, it extended reserve parking privileges to about 50 of its engineers. Formerly, these men were parking in the regular company lot on a catch-as-catch-can basis. The reserve status was given to them as additional recognition. The move apparently satisfied that objective.

As far as we know the company still

(Please turn to page 12)

Often seen in Engineers notebooks



GEAR SOURCES

1. Illinois Gear

A dependable outfit that can fill any gear order. They talk "quality" and that's exactly what they give us. They deliver on time! Emergency service when needed.

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Outstanding in the industrial diversification picture of North Carolina is metalworking, represented by companies making a variety of products.

The rapid over-all industrial growth of North Carolina has created an important market right at hand for producers of instruments, machinery and many other products of metal processing. With more than half the population of the country within overnight reach, North Carolina metalworking companies have advantageous access to the national market.

Abundant labor is available with proven ability to acquire new skills in a surprisingly short time. Experience records show exceptionally low absenteeism, turnover and accident rates.

Business development foundations in sixty-one communities are prepared to erect buildings to meet the specifications of incoming and expanding industries.

Desirable plant sites, urban and rural, are available in the mountain, piedmont and coastal regions of North Carolina.

Send for already-prepared briefs on any special location in mind or an all-state "Industrial Location Factors" brochure.

DEPARTMENT OF CONSERVATION & DEVELOPMENT
Raleigh 10, North Carolina
Governor Luther H. Hodges, Chairman of the Board

LETTERS

(Concluded from page 10)

has not obtained any additional parking space, although it is negotiating to do so. It estimates that it needs an area sufficient for an additional 100 cars. It admits that the over-all parking problem was not helped one iota by giving engineers reserve status.

Costs Story Stimulating

After reading No. 2 in your Program for Management, 1956, "Know Your Costs" (Mar. 19, page 83), I would like to express my appreciation for your presentation of this educational and stimulating article. I would like three copies.

W. Ray Stevens
Chief Methods Engineer
Moto-Mower Co.
Richmond, Ind.

Please forward three copies. I have found this article and the editorial, "Break the Cost Barrier" (page 41), in the same issue, most inspiring—and an inspiration. Also, timely.

F. D. Bauce
Supervisor
Cost Control Department
Torrington Mfg. Co.
Torrington, Conn.

Looking for Pipe Data

In the article, "Autos Take Bigger Share of Steel" (Mar. 19, page 154), is a table showing the distribution of steel by market classification for 1955.

It would be appreciated if you could supply us with annual data for 1946-1954 for standard pipe, oil country goods, line pipe, mechanical tubing and pressure tubing.

Are such data ever reported in feet by size of pipe?

It is my problem to determine "signposts" that will assist us in planning. Any information or suggestions you can give will be appreciated.

Wm. MacKerell Jr.
Sales Analyst
Dresser Mfg. Division
Dresser Industries Inc.
Bradford, Pa.

- *For data on tubular products for 1946-1954, write the American Iron & Steel Institute, 350 Fifth Ave., New York 1, N. Y., and ask for its yearly AIS 16 report.*

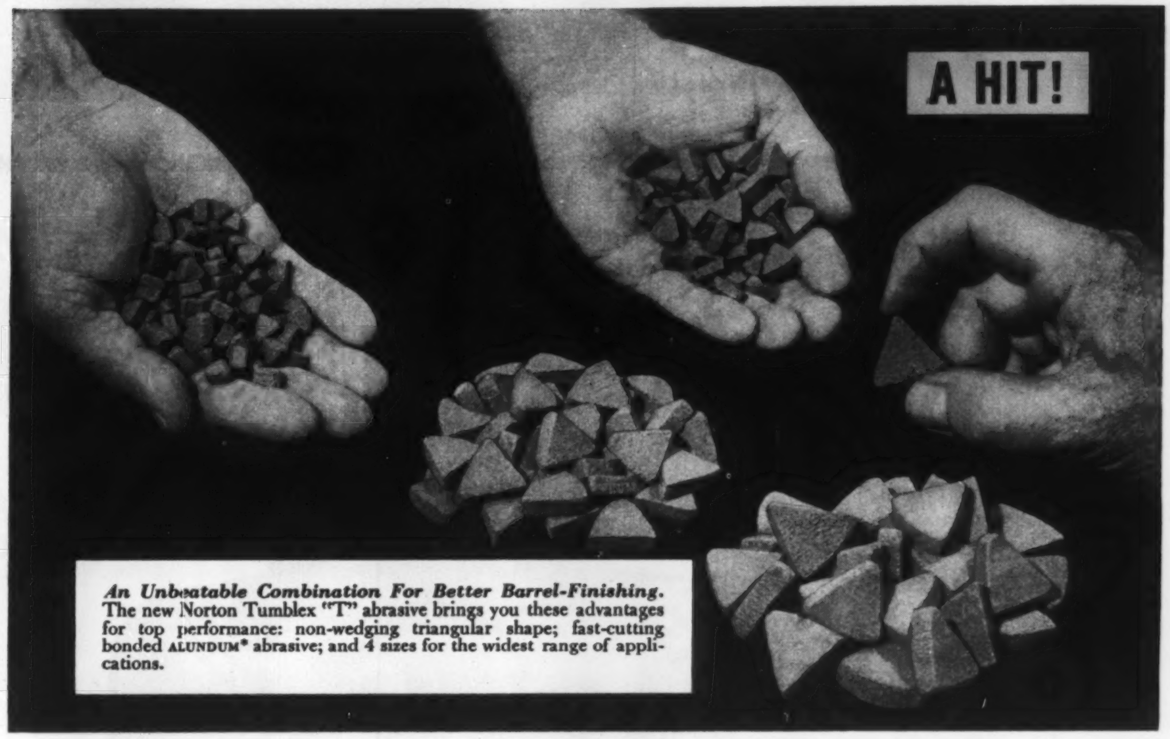
Product reports always have been on a tonnage basis—not on a size or footage basis.

Agents Agree on Form

Some time ago you published an article dealing with manufacturers agents and advised of a standard form of agreement that was available from the Manufacturers Agents National Association. Can you give us the address of the MANA so that we may write them direct for a copy?

P. A. Schkeeper
New Jersey Meter Co.
Plainfield, N. J.

- *The address is 1724 W. Main St., Alhambra, Calif.*



An Unbeatable Combination For Better Barrel-Finishing. **The new Norton Tumblex "T" abrasive brings you these advantages for top performance: non-wedging triangular shape; fast-cutting bonded ALUNDUM* abrasive; and 4 sizes for the widest range of applications.**

Users praise Norton TUMBLEX "T"

the new bonded, triangular tumbling abrasive

Reports prove Tumblex "T" abrasive brings many new "TOUCH of GOLD" benefits to barrel-finishing

Here's one of the most revolutionary barrel-finishing innovations ever developed. In typical on-the-job tests, Norton customers report that the new Tumblex "T" tumbling abrasive:

- ***"cuts tumbling cycle time from five hours to one hour."***
- ***"finishes steel and magnesium parts that could never before be barrel-finished."***
- ***"completely removes burrs from stainless steel parts in four hours. Abrasives previously used failed to do so in 12 hours."***

Everything about Tumblex "T" abrasive is designed for better barrel-finishing.

Its uniform triangular shape and size prevents wedging in recesses of parts.

Made of famous Norton ALUNDUM abrasive, it cuts fast, with no compound needed — resulting in shorter time cycles and lower costs per piece finished.

It provides maximum surface contact with parts being processed, assuring top quality work in fastest time.

It wears down evenly, keeping the same triangular shape. No small chips to lodge in holes, slots, etc. — and when worn down it can be used on parts requiring a smaller size abrasive.

Its lightness means less weight required to fill the barrel. Results are more uniform finish, without roll-in or roll-over of edges of parts.

Its chemical inertness, unaffected by acids, compounds or detergents, prevents spoilage common to other types of abrasive.

Send Your Work Samples

to our newly enlarged Sample Processing Department. Let us prove to you how the latest barrel-finishing equipment and techniques can improve your product quality and cut your finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. G-305

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Landis microsphere bearings speed

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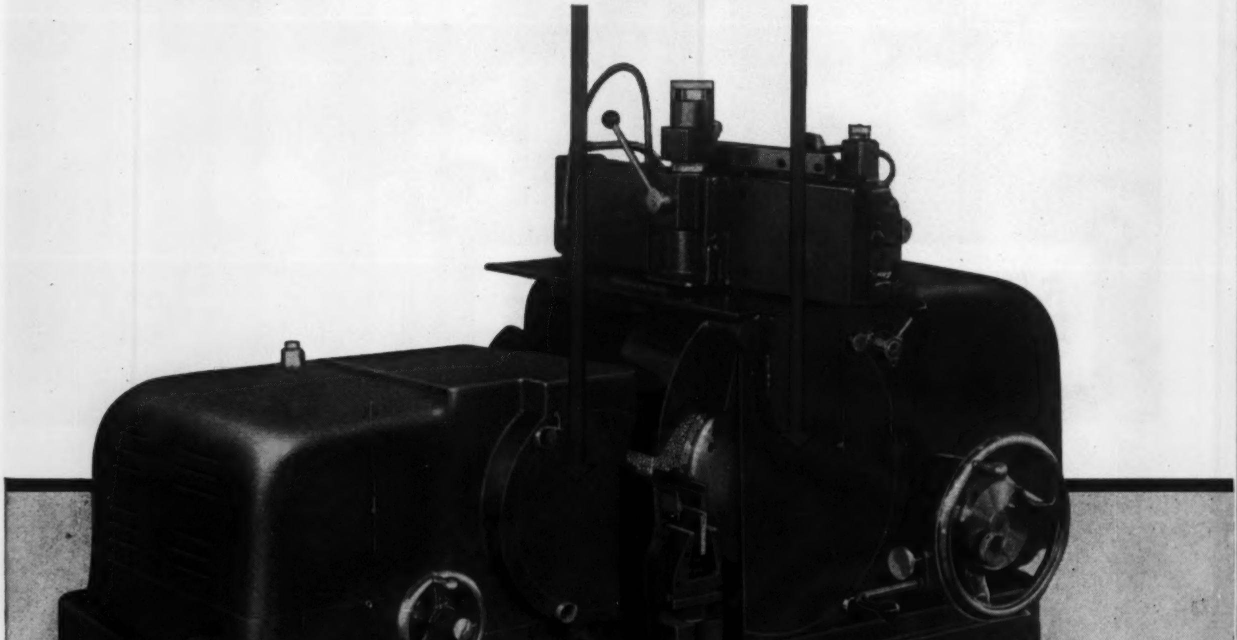

Landis No. 12 Centerless Grinder

LANDIS

precision grinders

centerless production... lower costs

Quick, positive sparkout
... for faster grinding cycles

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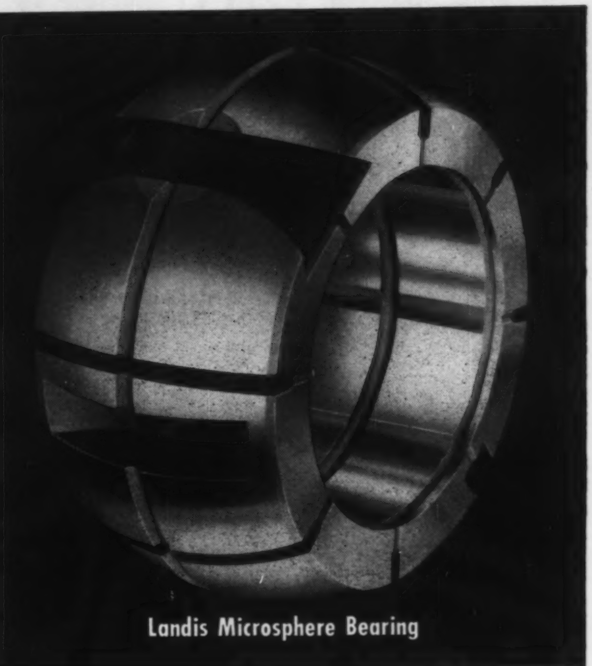
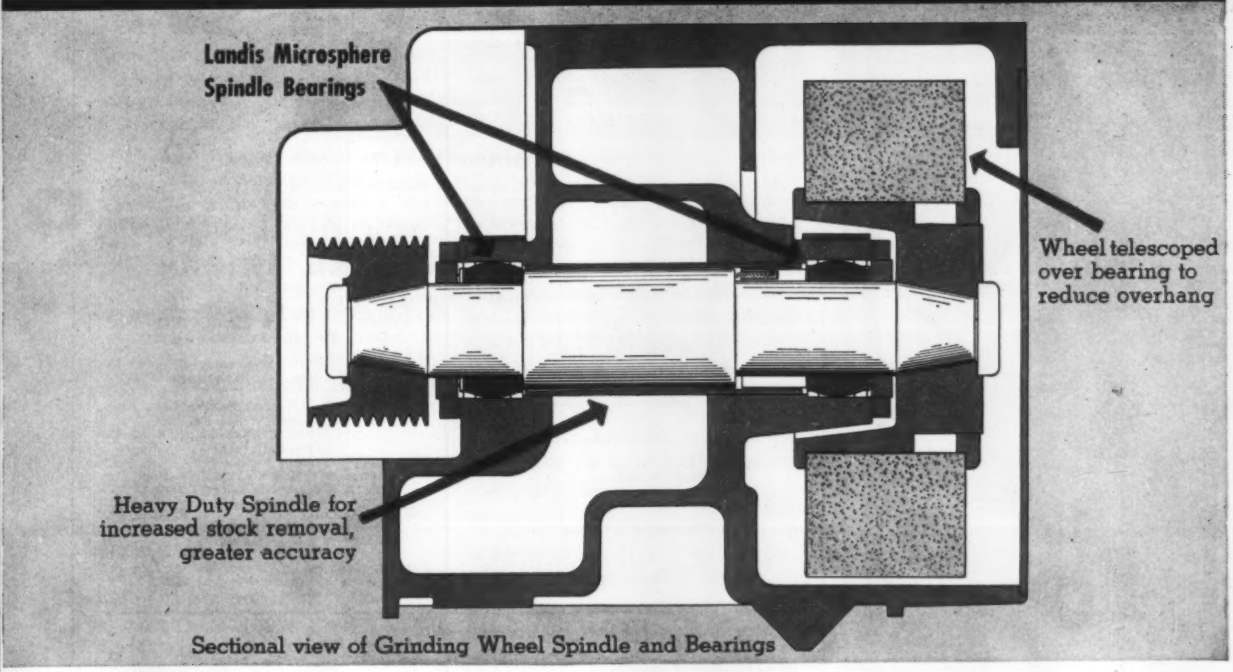
... for fine finishes

Simple, one-piece construction
... trouble-free operation

Increased rigidity
... heavier cuts to closer tolerances

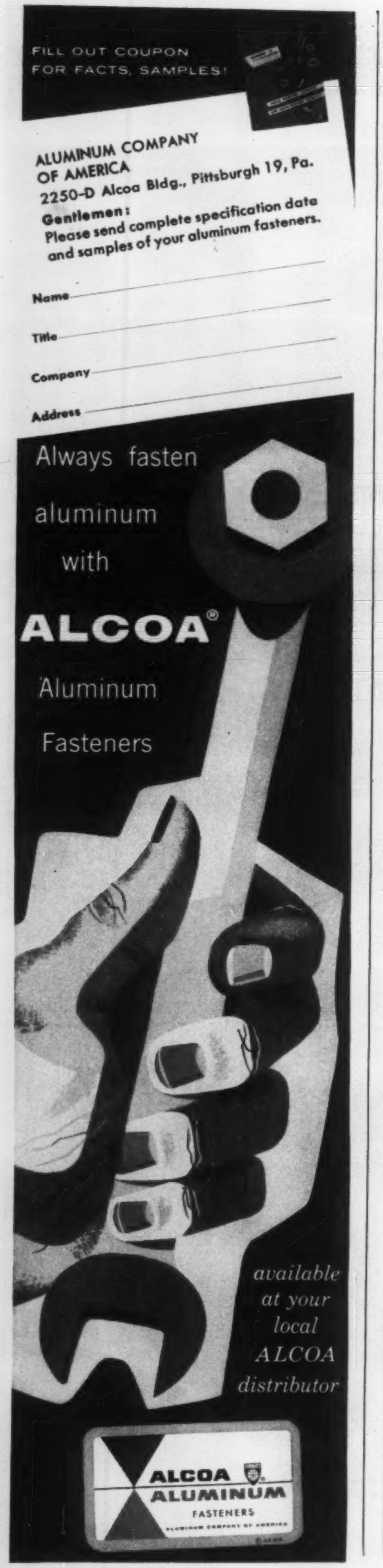


Landis Microsphere Bearing


Landis Microsphere Spindle Bearings
Wheel telescoped over bearing to reduce overhang
Heavy Duty Spindle for increased stock removal, greater accuracy

Sectional view of Grinding Wheel Spindle and Bearings

LANDIS TOOL COMPANY / WAYNESBORO, PENNSYLVANIA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APRIL 1956

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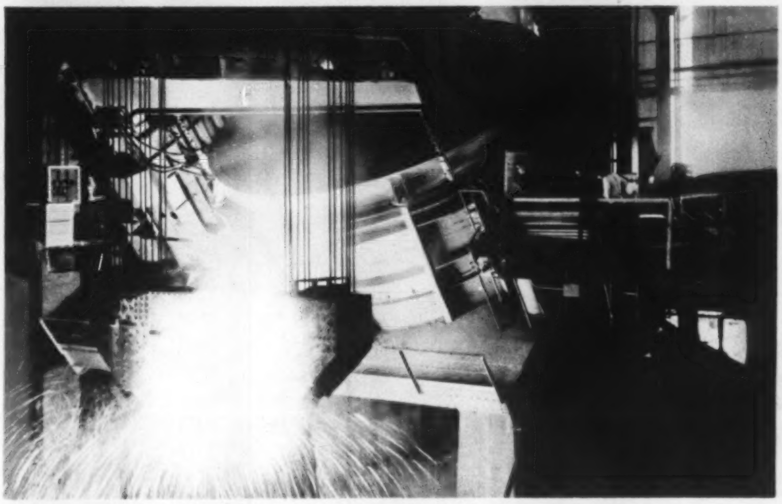
VOL. 3 NO. 1

ELECTRIC FURNACE STEEL BOOMS

Carbon Steels in Electric Furnace Up 55%; Share of Market Increases



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Of still greater interest is the fact that the electric furnace carved out for itself in 1955 a bigger slice of the carbon steel pie than it enjoyed in any previous year, increasing its share of market by 23% over the 1954 figure.

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A long list of valuable properties make this new iron much in demand in such diverse industries as aircraft, farm machinery, tool and die, pulp and paper, petroleum, automotive and many more. Ductile iron, or nodular iron – as it is oftentimes called – can be twisted, drawn, bent and otherwise deformed without fracture and is much stronger than ordinary grey iron. Also, it shows exceptional resistance to impact and to oxidation and growth at high temperatures.

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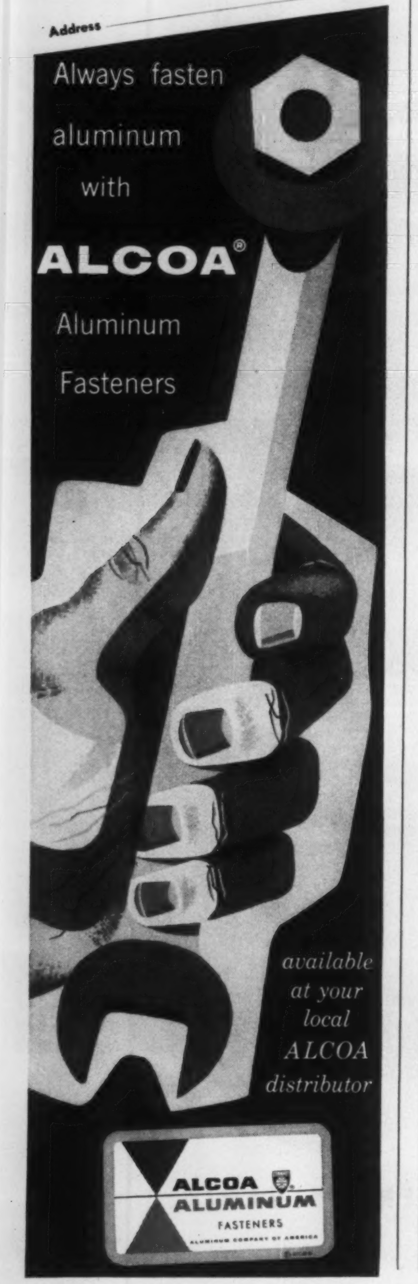

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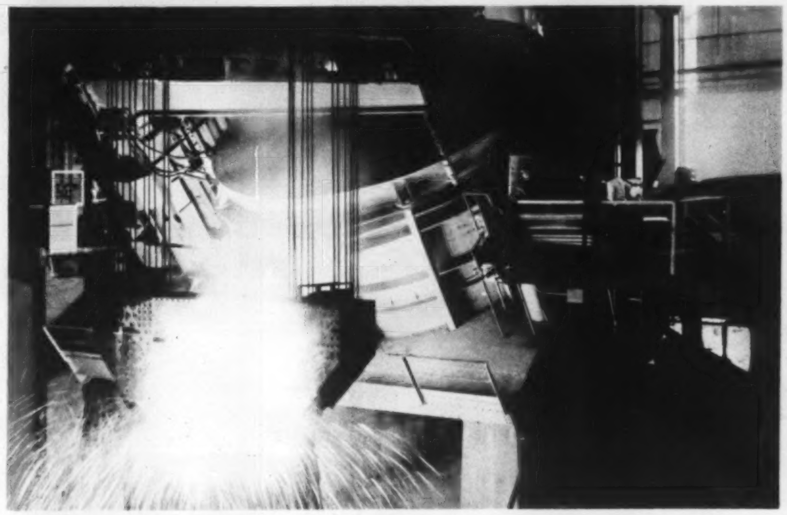

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Baking Capacity Expanded in Latest Move to Meet Increasing Industrial Needs

Increased Electrode Demand Responsible; Pace Destined to Continue

Substantial progress toward readying 20 million pounds of new baking capacity at National Carbon's National Plant, Niagara Falls, N. Y., has been reported by W. H. Feathers, Vice President, Industrial Products.

Major rearrangements and additions, begun last year at this veteran National Carbon electrode plant, will be completed within the next two months, according to Mr. Feathers.

As in the cases of the company's other electrode plant expansions of the last few years, the Niagara Falls step was taken to keep pace with the heavily increasing demand for furnace electrodes – particularly the larger sizes.

The new installation involves large size gas baking furnaces and a monetary investment, which while impressive enough in itself, represents only a small fraction of the huge amounts National Carbon has poured into its 5 electrode plants in the last five years. As a result, the Clarksburg, West Virginia, plant, the National, Acheson and Republic plants at Niagara Falls, N. Y., and the Columbia, Tennessee plant have all made big forward strides. Of the group, Columbia, Tennessee–showcase plant for the entire carbon industry – has seen the most spectacular growth.

The rapid growth of the electric arc furnace, together with responsible predictions of steel industry analysts, sustain National Carbon's confidence in the future – a confidence the company has set out to back with product.

W. H. Feathers, Vice President
Industrial Products, National Carbon Co.
"... Confidence ... backed by product"

Cited particularly are two significant trends:

1. Electric arc furnaces of all types in the U. S. now number over 2,000 with the number growing rapidly, as 1955 alone brought furnace makers more orders than ever before.

2. In the electric arc furnace's major application field, steelmaking, production is expected to soar some 40% in the next five years alone.

On the basis of the carbon industry's historical growth since its founding in the last century – and in the light of predictable demands from an insatiable, multiplying population – carbon men see many more expansions to come.

ELECTRIC FURNACE

continued from page 1

the electric furnace can be operated either in excess of, or below, rated capacity and can turn out any kind of steel the situation requires. Production experience shows the electric furnace has a greater availability than the open hearth.

- **Smaller Space Requirements**–An electric furnace shop designed to produce 500,000 tons of ingots annually will cover only about 75% of the ground area required by an open hearth shop of like capacity, according to a study by one major steel company.
- **Closer Temperature Control** – Operating men agree unanimously that the electric arc furnace lends itself readily to temperature control. The rate of heat input is limited only by the rate of heat transfer in the bath and temperature may be raised in a matter of minutes.
- **Product Quality**–The electric arc furnace can hold rigid product specifications on all types of steels.

The production of plain carbon steel, in the electric furnace, often shows lower costs than other types of furnaces making this product. Power cost economies, improved electrode performance and prevailing market factors are important considerations in arriving at a final determination.

Ready Electronic Products Laboratory

A new electronic products development laboratory has been established by National Carbon at its Cleveland Edgewater plant. It will be in full scale operation this June.

New products derived from the company's expanded research in the field of solid state physics will be developed

continued on next page; column 3

National Carbon Company's
CARBON AND GRAPHITE NEWS
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Dr. Edward Goodrich Acheson

Man of Genius Man of Foresight Man of Fortitude

This is the man whose 100th Anniversary is being commemorated this year.

It required genius to convert repeated failure into success – foresight to attack so many experiments that had been attempted many times before, but without success – fortitude to keep on in the face of misfortune, ill health and other adversities.

Dr. Acheson was born on March 9, 1856, in the southwest corner of Pennsylvania, of good sturdy, pioneering stock; a heritage that probably had much to do with shaping his destinies. The total accomplishments of Dr. Acheson throughout his busy life are too many to record here, but the revolutionizing effects of his contributions –"Carborundum" abrasives Manufactured Graphite, the Electric Resistance Graphitizing Furnace, and Colloidal Graphite bear repeated emphasis.

It is certain that Dr. Acheson's part in the development of manufactured carbon and graphite and in the field of electrothermal phenomena, made possible the successful electric arc furnace. And, it is just as certain that without

continued on next page; column 1

MAKE ULTRA PURE GRAPHITE ANODE

Recent successful production of an ultra high purity graphite anode for use in a mercury type caustic – chlorine cell has just been announced by National Carbon Company.

Electrolytic first cousin of the electrothermic (electric furnace) electrode, the new "National" graphite anode is the purest graphite anode yet produced and lasts longer than previous graphite anodes approximating its purity.

Asked for more details on the new anode, an Industrial Products Department spokesman explained, "we use a selected raw material and process it by an exclusive National Carbon development which takes full advantage of the superiority of that raw material."

It was pointed out further that the company's own purification method was a prime factor in the successful manufacture of graphite anodes of very low vanadium content. "In fact," said the spokesman, "we recently met a leading chlorine-caustic producer's stringent specifications for graphite anodes with a vanadium content of only 2 parts per million. In the bargain we delivered an all-round better product than he had been able to obtain from his only previous source, Germany. So, we've scored twice – made a better anode – brought home a welcome piece of business."

DR. ACHESON

continued from preceding page; column 3

the arc furnace, our economy today would be completely different—and far less advanced.

So, it is equally fitting that the 50th Anniversary of the first U. S. electric arc furnace for steel making is also being celebrated this year. This furnace was installed at Halcomb Steel Company, Syracuse, New York, in 1906. Designed by Dr. Paul T. Heroult, it was a direct arc, single phase, three-ton capacity unit, operated in duplex with an open hearth. The era of stainless steel, high alloy specialty steels, fine tool steels, and the very prolific family of ferro-alloys began in 1906, to be followed by common steel grades, specialty irons, elemental phosphorous and many other products.

Too great a tribute cannot be paid to Dr. E. G. Acheson and to the first steelmaking furnace—two events that are inexorably related.

Date line . . . 1886

National Carbon Company organized for the modestly stated purpose . . . "to manufacture miscellaneous carbon products."

Electric Arc Furnace Capacity Sets Record In 1955

The record tonnage capacity of electric arc furnaces in operation at the end of last year, and the orders for new furnaces already on the books for delivery early this year, are indicative of still new arc furnace tonnage records to be posted in 1956.

While the installed capacity is of great importance, there is even more significance in the upward trend of unit installations coupled with the increase in the physical sizes of the new furnaces. Today's newest 200 ton giants with their 24½ foot diameter hearths dwarf the first steelmaking electric furnace in this country, a three ton model with a small, rectangular hearth.

The reasons for the increasing utilization of the electric arc furnace in melting, smelting, reducing or refining, are wrapped up in its versatility and flexibility. These advantages keep it on tap whenever needed and for whatever product is required—steel, phosphorous, calcium carbide, ferro-alloys, non-ferrous metals, or any of the many other electric furnace products.

DUCTILE IRON

continued from page 1; column 2

carbon lined cupola. "National" carbon cupola linings last as much as 5 times longer in continuous operation than traditional cupola refractories, according to National Carbon engineers. Furthermore, carbon linings are neutral – the operator can employ acid, basic or neutral slags as dictated by his various metal charges.

Characteristics Discussed

Informed sources explain that the change in the microstructure of cast iron, which makes it so ductile, derives from adding very small percentages of magnesium, cerium or certain other elements to the molten iron just before casting. This addition converts into spheres or spheroids, the flake graphite as found in grey iron or in the compacted aggregates characteristic of malleable iron. With the embrittling and weakening effects thus removed, the microstructure becomes stronger.

Ductile iron can be heat treated much the same as steel; it also can be welded, soldered and brazed and, because of its good fluidity in the molten state, it can be cast in intricate shapes and thin-sectioned parts.

Cost Factors

Ductile iron costs more than cast iron but less than steel. The foundry and cleaning costs are lower than for steel castings, with machining cost considerably lower because of faster cutting and longer tool life. And, good castability plus excellent engineering properties often recommends ductile iron as a replacement for expensive forgings and weldments.

Giant "National" carbon electrode is 53 inches in diameter by 110 inches long and weighs 17,000 pounds. It is shown here by Joseph P. White, Assistant Plant Manager of National Carbon's Republic Plant, Niagara Falls, New York.

Unveil Giant New Furnace Electrodes

National Carbon Company has unveiled another history-making advance in the manufacture of large carbon and graphite furnace electrodes.

Company spokesmen report 1955 saw the forming of the world's largest electrode – a 9 foot long, 53 inch diameter carbon cylinder scaling 17,000 pounds. During the same period National Carbon also introduced the biggest graphite electrode ever made, a huge cylinder 45 inches in diameter, 110 inches long.

Both types of electrodes are for submerged arc furnaces, their full significance is expected to be reflected in larger, more efficient submerged arc furnaces, according to National Carbon spokesmen.

ELECTRONICS LAB

continued from preceding page

by this new organization. Many of the products are expected to be of types not directly related to National Carbon's present lines of consumer and industrial products, according to company sources close to the new undertaking.

NATIONAL CARBON LAUNCHES ELECTRODE EDUCATION SERIES

Furnace Operators Benefit From New, Free Program; Better Furnace Efficiency, Lower Costs Sought

National Carbon Company has kicked off another new, far-reaching educational program to help furnace operators get better performance through improved utilization of the company's complete range of electrode products, according to Fred B. O'Mara, Manager of the Electrode Product Sales Department.

Introduced at last December's Electric Furnace Steel Conference, A.I.M.-M.E., Pittsburgh, Penna., the new program represents National Carbon's latest assist in a long line of programs designed to help its customers get the greatest operating efficiency from furnace electrodes. Spokesmen were quick to point out that National Carbon was the country's pioneer electrode producer and the first organization to conceive, and so broadly implement, comprehensive training for its customers' furnace operators.

Give Program on Request

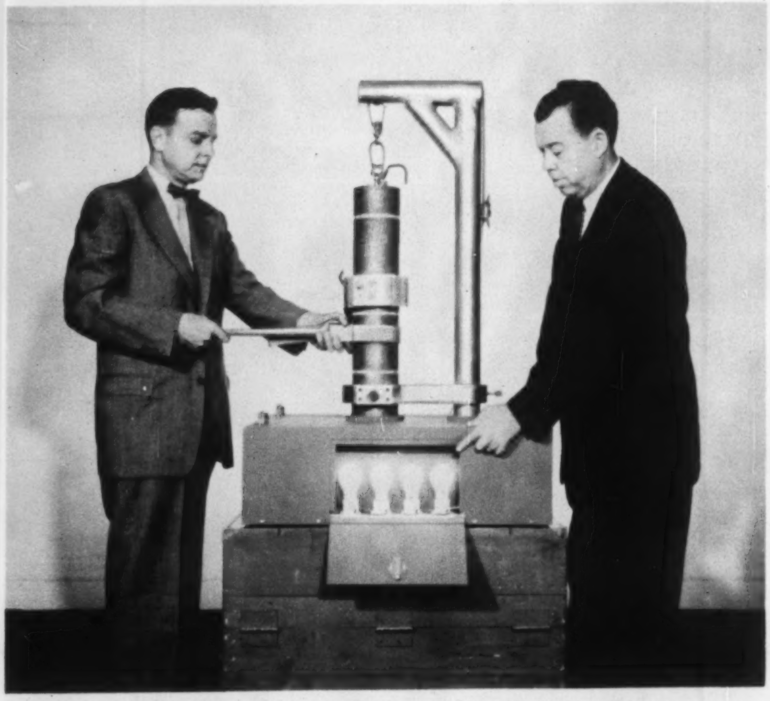
"We give our oral-visual educational series on request, right at the customer's plant – no strings attached," declared J. W. Shea, Manager of the Electrode Service Department. "Of course, we have to schedule carefully because of the program's popularity." He stressed that the series involved slides, lecture-demonstration and spontaneous audience participation – it is not a "canned program".

Commenting briefly on the company's shirt-sleeve faculty who present the course, Mr. Shea said, "We've got the biggest, most experienced service group in the business. Our men are carbon and graphite experts. They've worked on developing and engineering the material, they've produced it in our plants, they know its application."

Operators Should Understand Carbon

At the heart of the new program is the recognized need for operators to understand fully the recommendations made by the electrode manufacturer and the reasons underlying those recommendations. The operator should know something of the unique characteristics of carbon and graphite and what occurs when electrodes made of these materials are used in an electric furnace.

"Since the ultimate destination of National Carbon's electrodes is the electric furnaces in its customers' shops," said Mr. Shea, "we in the Electrode Service Department are particularly anxious to help our customers get the very best operating results. This means taking all the indicated steps to insure that the electrodes operate at maximum efficiency so that our customers will benefit from *all* of the service which we have built into our product."



R. L. Westlake, Electrode Service Engineer (left) and J. W. Shea, Manager, Electrode Service Department test novel electronic device for simulating steps in electrode joint assembly.

Electrode Service Department engineers explained that an electrode must be, first of all, a good electrical conductor. It must be strong to resist mechanical breakage. Also, it must have excellent thermal properties to stand up to arc temperatures which climb above 6,000 degrees F. Carbon and graphite are the only materials with the requisite properties.

How Electrodes are Consumed

Mr. Shea declared, "people are usually quite surprised to learn that furnace electrodes can be consumed in five different ways – it's not just a matter of 'burning up'. Sublimation, adsorption, dipping, breakage and oxidation are all factors."

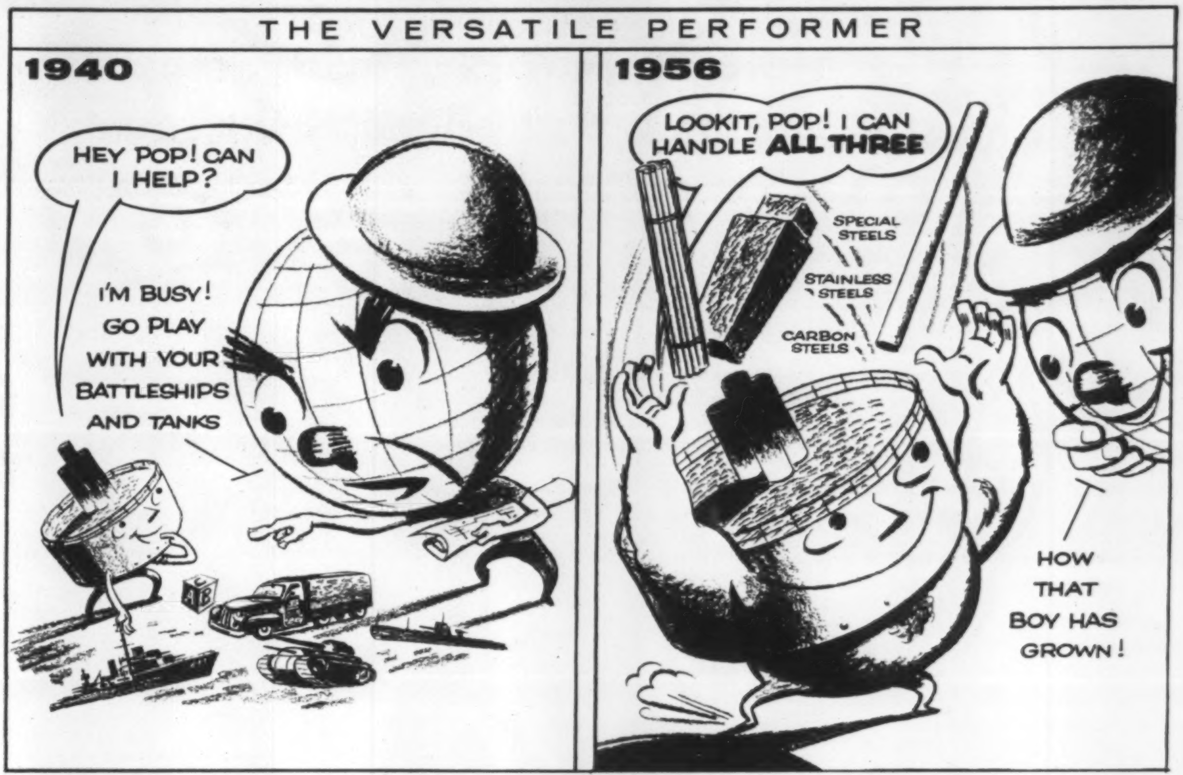
Sublimation, adsorption and dipping all take place at the arc tip. Although the first two are not subject to regulation, it is possible to reduce electrode consumption by changing dipping practice. Dipping refers to a method some operators employ to raise the carbon content of the melt by lowering the electrode and dipping it directly into the molten metal.

Oxidation and breakage occur higher up the electrode column. They are more easily controlled by such means as temperature manipulation, cleanliness, maintenance, mechanical adjustment and careful handling. In this area lie real opportunities for electrode conservation, according to National Carbon's electrode experts.

Feature Electrode Demonstration Device

One of the most universally popular features of the lecture-demonstration series is a novel electrode demonstration unit which simulates all the steps in electrode joint assembly. Conceived and built by the electrode service group, the unit demonstrates how dust and dirt, joint chips and socket clamping affect operation. It also shows loose joints vs. tight joints in relation to electrode efficiency.

Queried on the reaction to the new service program, Messrs. O'Mara and Shea indicated that it has been excellent. To cite just one case, a highly placed steel executive has recently thrown his enthusiastic endorsement behind the program and has urged its full exploitation within his own organization. Better furnace efficiency at the lowest cost is his goal, too.


THE VERSATILE PERFORMER
1940
HEY POP! CAN I HELP?
I'M BUSY! GO PLAY WITH YOUR BATTLESHIPS AND TANKS
1956
LOOKIT, POP! I CAN HANDLE ALL THREE
SPECIAL STEELS
STAINLESS STEELS
CARBON STEELS
HOW THAT BOY HAS GROWN!

National Carbon Lists Latest Free Literature

Several recent company publications are available for the asking. To receive any of the following, just address Advertising Department, National Carbon Company, Dept. CGN, 30 East 42nd Street, New York City 17, New York. Please include your name, title and company address.

1. Past issues of the quarterly "Carbon and Graphite News" with main articles as follows:

August 1954—Electric Furnace Steel – Past, Present and Future by W. B. Wallis.

December 1954 – The Electric Arc Furnace – An Appraisal for Management by Charles W. Vokac.

March 1955—Flexibility of the Electric Arc Furnace – What It Means to the Steel Producer by E. A. Hanff.

July 1955 – The Indirect Arc Electric Furnace Development and Application by B. W. Schafer.

Sept. 1955 – Electric Utilities and the Electric Furnace by Paul D. Brooks and Paul W. Emler.

Dec. 1955 – Production of Quality Steels in the Electric Furnace by Harry F. Walther.

2. New 6-page Catalog Section S-4905, "National" Graphite for Atomic Energy Applications.

3. Technical Treatise—64-page book "The Production and Properties of Graphite for Reactors". Limited quantities.

4. New 16-page Catalog Section A-4004 "National" Spectroscopic Products.

5. Educational Series for Electrical Maintenance Men, "National" Brush Digest, a bimonthly pamphlet series.

6. 8-page pamphlet describing the characteristics of the first General Purpose Industrial Brush, "National" N-4.

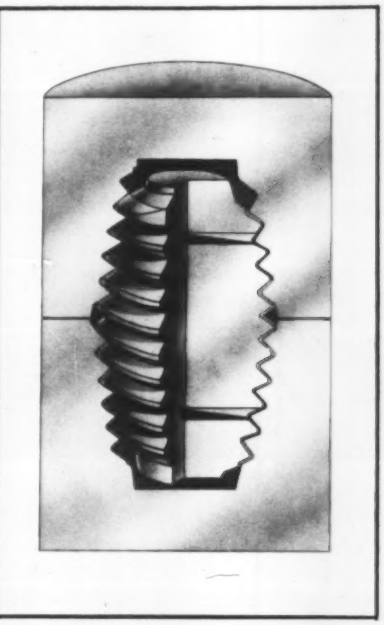
7. New descriptive literature covering "National" carbon products for use in cupola furnaces. Ask for Catalog Section S-5450. Installation sheet is also available—Catalog Section S-5455.

Pitch Reservoir Pin Huge Success — *New Patent Pays Off*

National Carbon's new patented pitch reservoir connecting pin has proved very successful in keeping electrode joints tight.

The new pin, identical with standard, tapered, graphite nipples in size, shape, tolerances, composition and quality, is distinguished by the pitch-filled reservoirs near each end of the threaded portions. As the connecting pin becomes hot, the pitch flows from the reservoir into the threaded section of the joint where it cokes out, cementing and locking the threads of the nipple and socket together. This action occurs at temperatures well within the range of the operating column. No application of cement or dowels is required.

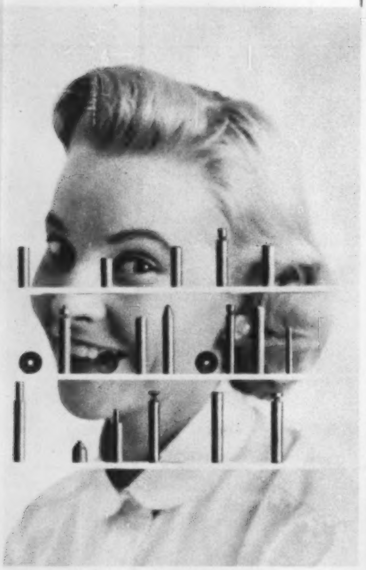
The new pin is proving highly effective in eliminating collar- and nipple-loss at the arc end of the electrode, resulting in greater furnace efficiency. Predictions are that it shortly will supersede the plain-type tapered connecting pin.



World's Largest Carbon Forming Unit— almost entirely automatic – completely fills a 13 story building at National Carbon's Columbia, Tenn., plant.

Midgets at work

Pygmy Electrodes Do Giant Size Job



Some of the 37 preformed special graphite spectroscopic electrodes contained in National Carbon's complete line of spectroscopic products.

Electrodes so small a half dozen fit easily within a thimble – these are the latest additions to National Carbon Company's line of high purity spectroscopic products.

Size-wise, the tiny, preformed electrodes – there are now 37 shapes to meet any spectroscopic need – are a far cry from the multi-ton monsters which fire a modern electric arc furnace. But, they possess an industrial importance completely belying their Lilliputian dimensions.

Like their furnace-borne brothers, spectroscopic electrodes are heat producers. They absorb hearty charges of electricity until their tips, intensely hot, vaporize small samples of unknown elements, or compounds, which the spectroscopist wishes to analyse. Since every chemical element when raised to incandescence produces its own characteristic color lines, or spectra, the trained technician need only identify the emission lines of his unknown sample. Simply, quickly, conveniently he performs his analysis, answers the questions—what and how much?

Today, spectroscopic analysis is a rapidly growing technique—a convenient tool which in many cases is replacing the traditional chemical analytic methods in such broad fields as metallurgy, chemistry and biology. The technique relies heavily on high quality, high purity and uniformity of the graphite used.

Begin New Packaging Program; Changes to Benefit Customers

Graphite Electrodes and Connecting Pins First; Other Products to Follow

Plans for new packaging to benefit customers through improved product protection and identification have been announced by National Carbon Company.

The improvements will encompass the company's entire line of industrial products. First items scheduled for the change are electric furnace electrodes and related products marketed under National Carbon Company's brand name, "National".

One of several proposed designs for electrode connecting pin cartons is discussed by F. B. O'Mara (left), Manager, Electrode Product Sales and C. G. Ollinger (right), Assistant Advertising Manager, National Carbon Company.

According to company sources, the initial project to be tackled is an attractive, durable end cap for 12 through 24 inch diameter graphite electrodes. An industry innovation, the cap fits snugly against the electrode to protect its socket from dust and chipping from the time the electrode is shipped until it goes on the customer's furnace.

NATIONAL
TRADE-MARK

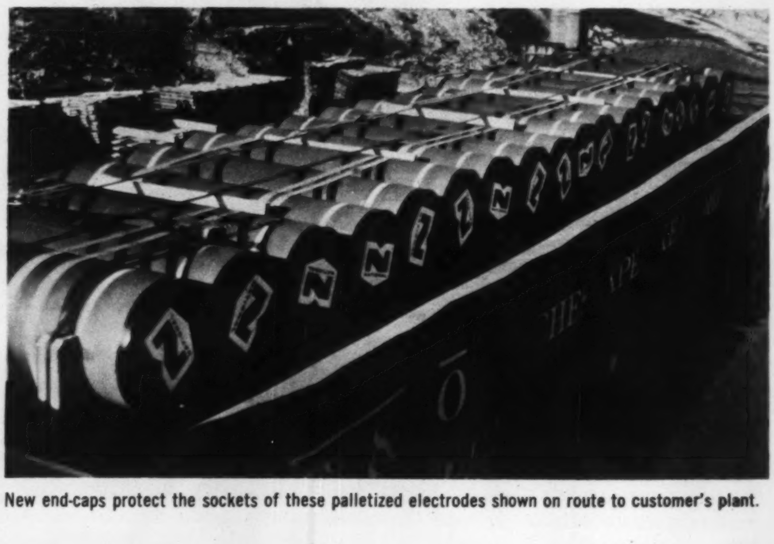
National Carbon's familiar product identification in new dress. Both the term "National" above and the "N-in-shield" device shown on electrodes below, are trade-marks of Union Carbide and Carbon Corporation.

Work on Pin Cartons

Another phase receiving current attention is the package standardization and legibility upgrading on the entire line of connecting pin cartons. Priority has been given to pin cartons for the 20 inch diameter graphite electrode with new cartons for other sizes to follow soon.

The entire program is being coordinated by the company's Quality and Specifications group with help from the Advertising and Sales Departments. The package design specialty firm, Robert G. Neubauer, Inc., is handling designs for electrode products.

It is expected that several months will be required to complete the project for the entire array of industrial products because of the large number of items involved. Included are brushes, lighting carbons, processing equipment and a whole range of carbon and graphite specialties.



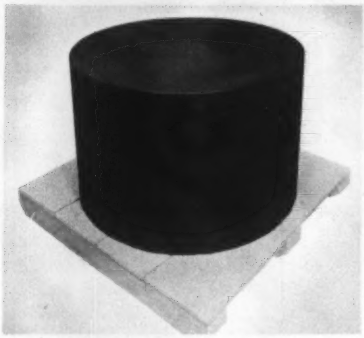
New end-caps protect the sockets of these palletized electrodes shown on route to customer's plant.

Reactor Program to Boost Steel Fabricators' Business

Graphite Gets Increasing Role in Atomic Program

A $700 million annual business for manufacturers of reactor components by 1963 is being forecast by authorities in the field. Of this, a sizeable slice is destined for steel fabricators.

Nuclear reactors are, in effect, atomic furnaces fueled by fissionable elements. They leash the explosive power of the all too-familiar atom bomb and make it available in relatively smaller, stretched out doses for man's benefit.



"National" High Density Graphite, 40 inches in diameter, 1.90 $gms/cm.^3$ density.

Of the several types of nuclear reactors, the kind whose end product is electric power is attracting most attention. Power reactors loom as future competitors to today's fuel-steam generated electricity. Some informed quarters predict 2 million kilowatt capacity from power reactors by 1960 with the figure surging to 175 million by 1980.

One of the significant outgrowths of the expanding nuclear program is the increasing importance of high density, high purity graphite for reactor construction and allied uses. Graphite itself has long held a respected place in such diverse applications as processing equipment, brushes for electrical machines, lubricants, illumination and electrolytic and electrothermic electrodes.

In the nuclear field, graphite's chief virtues are its ability to capture wild, potentially dangerous neutrons which speed helter-skelter through the reactor and also its unique property of greater strength at high temperature than at room temperature. Thus, graphite excels as a construction material for moderators, reflectors, shielding and molds and crucibles.

As an aid to understanding more about graphite's nuclear applications, National Carbon Company has recently published 2 works – both have been offered free. One of these publications is a technical treatise – a 64-page book entitled "The Production and Properties of Graphite for Reactors". The other publication is a less technical bulletin detailing various graphite grades, their characteristics and uses in atomic energy applications.

Typical "National" Graphite Molds and Crucibles Used In Metal Casting. Largest Mold Shown is Nearly 3 Feet Tall.

Carbon Found Ideal For Cupola Furnaces

A promising new metallurgical application of carbon is rapidly developing in the field of cupola refractories, according to National Carbon sources.

Pursuing this trend, the company has embarked on an extensive campaign aimed at showing foundry operators the numerous operating advantages possible when carbon is employed as a cupola refractory. Already, a rapidly increasing number of foundries are endorsing "National" carbon cupola products as the most practicable answer to their refractory problems, it was pointed out.

Among the unique properties of elemental carbon which recommend it particularly for cupola use are these:

- Carbon is not attacked by acid or basic slags.
- It withstands extreme thermal shock.
- It has no melting or softening point.
- It is not wet by molten metals.
- Carbon shows high mechanical strength at all temperatures and its strength increases with increased temperatures.
- Carbon resists abrasion well.

continued on next page; column 2

National Carbon Company Announces Progress on Giant New Research Center

Laboratory to develop future materials today

Union Carbide and Carbon Corporation will begin moving equipment into its new research laboratory at Parma, Ohio, next month, according to spokesmen for National Carbon Company which will manage the new unit for the Corporation.

The new laboratory will carry out basic exploration in physics and the interrelation of physics and chemistry applied to metallic and non-metallic compounds of carbon and analagous compounds. Important contributions to the future requirements of industry are expected to result from these studies.

Dr. Clarence E. Larson
Vice President in charge of Research
National Carbon Company

Among the possible far-reaching developments expected to come from today's investigations are materials for new and improved transistors and related electronic devices, new and improved refractories, and the key to further progress in ferrites – complex inorganic compounds which show promise for automation machinery and computers.

Dr. Robert G. Breckenridge
Director of Research
National Carbon Company

continued on next page; column 1

HAIL "DEVIL'S IRON" NEW MAGNET METAL

A fifty year search for a better magnet steel has paid off in a new Allegheny Ludlum steel which enables size and weight reduction in important electrical equipment.

The new material is a grain oriented silicon steel popularly called "Devil's Iron" – a nickname originating with rollers and pack openers who handled the metal.

The new silicon steel represents a far-reaching advance in electrical steels for concentric core transformer windings, motor and generator stator parts, business machine and telephone components and a host of other specialized uses.

As a magnet material, grain oriented silicon steel, specially rolled and heat treated makes it possible to get more pull with less power. Also, important advantages are claimed in the conservation of copper and other materials employed in electrical equipment.

NEW RESEARCH CENTER

continued from preceding page; column 3

The new laboratory Center with its substantially augmented scientific staff represents the most recent step forward in National Carbon Company's industrial research activities. The company's organized research program, reaching back to the turn of the century, was initiated when National Carbon established America's first industrial research laboratory in 1902.

NATIONAL
TRADE-MARK

ELECTRODES AFLOAT

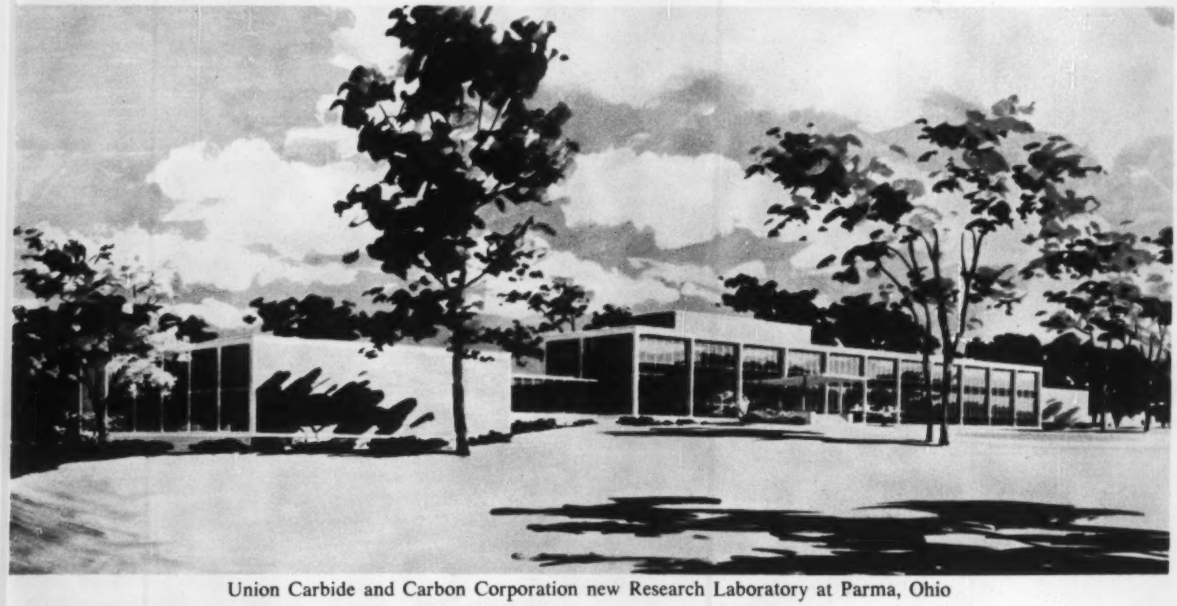
Approximately 1,000,000 pounds in one shipment!

The largest shipment of electric arc furnace graphite electrodes ever made is shown in this barge load of 972 graphite electrodes, 20-in. diameter x 72-in. long, each weighing about 1231 pounds. Shipment was made by National Carbon Company, from its plant at Columbia, Tennessee, to a Chicago destination.

CUPOLA FURNACES

continued from preceding page; column 2

The most important factor in establishing carbon's superiority as a cupola refractory, however, lies not so much in any one of its advantageous properties, alone, but rather in the fact that they are all present in every piece of carbon. No other material offers such a combination – an ideal answer for well zone linings, breast and tap hole constructions, slag dams and slag and iron trough linings.



Union Carbide and Carbon Corporation new Research Laboratory at Parma, Ohio

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

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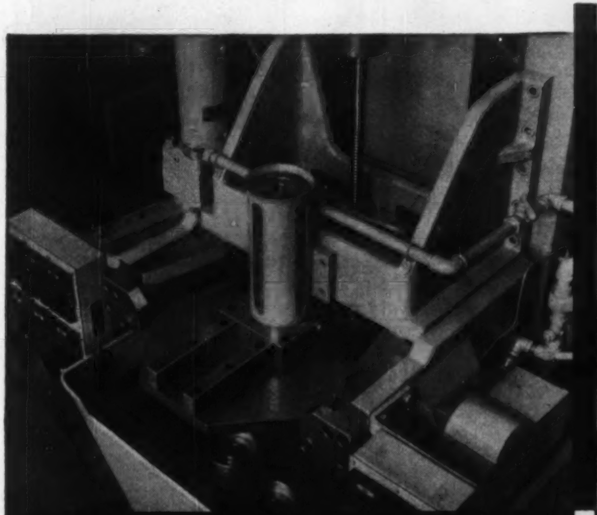
Printed in U.S.A.

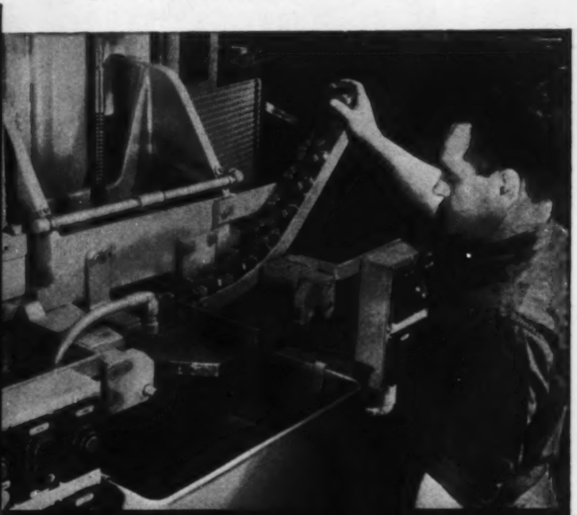
automatic broaching can be low cost broaching the *American* way

The broaching operation can justify automatic set-ups on smaller volume jobs when the tooling is kept relatively simple and the cost low. Illustrated here are two American machines which feature:

1. **Automatic cycle**
2. **Simple tooling**
3. **Magazine or chute feed**



This American vertical pull-up (VP) machine broaches the hub and spline of an automotive clutch hub. A hydraulic slide interlocked to the automatic machine cycle shuttles parts from the tube magazine into broaching position. The parts are broached and then ejected below. The slide automatically moves back during the broaching stroke and reloads a part. Production is over 300 parts per hour.



Here an American VP broaches the I.D. of a sun gear converter part for an automotive transmission. The inclined gravity chute feeds parts into the positioning fixture on the hydraulic slide. Production is over 300 parts per hour. Both machines will run continuously on automatic cycle. The operator only has to keep the magazines filled with parts.

Why not let American help you solve your broaching problems. Just send a blueprint or sample for a free estimate. American makes a complete line of broaches, broaching machines and fixtures. For further information on American VP internal broaching write for Catalog No. 401.

AMERICAN ***American*** **BROACH & MACHINE CO.**

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

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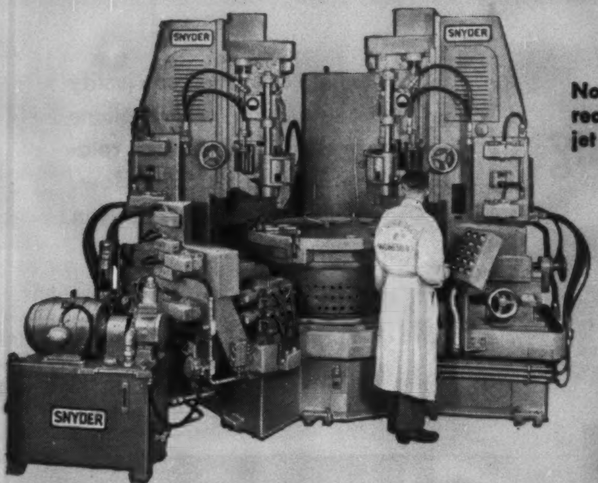
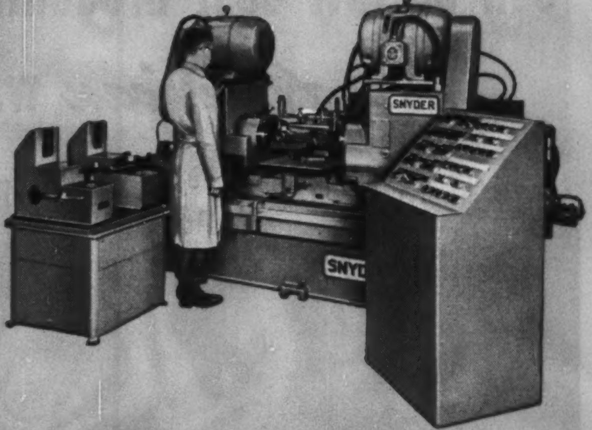
See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

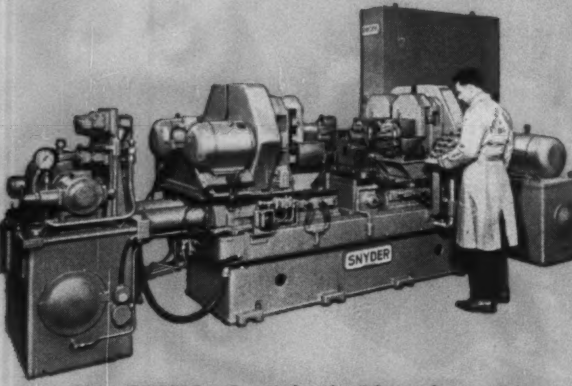
SUNDSTRAND



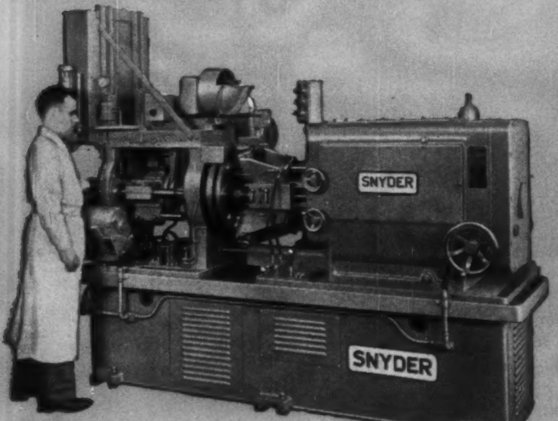
No. 70165—Special index machine to drill and ream holes in rims of outer shroud spacers for jet engines. Production 2 parts per hour.



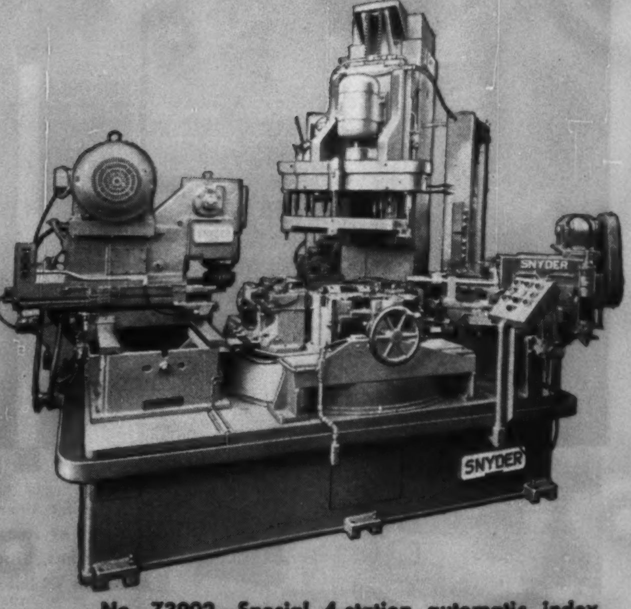
No. 65412—Special automatic machine, for weighing and precision balancing a variety of heavy-duty and diesel engine connecting rods from 7⅜" to 12" center distance. Weighs rods and automatically balance mills to plus or minus 2 grams.



No. 207390—Special, double-end precision boring machine for finish boring, counterboring and chamfering counter shaft, intermediate and shifter shaft holes on power take-off cases. Production 82 pieces per hour at 80% efficiency.



No. 68526—Special double end trunnion machine, fully automatic, for machining special aircraft rivets. Machine is automatically loaded and unloaded. Production rate varies with size of rivet.



No. 73902—Special 4-station automatic index machine for milling joint face, drilling and reaming vertical and horizontal holes in exhaust manifolds. Production 80 pieces per hour at 80% efficiency.

SNYDER VERSATILITY

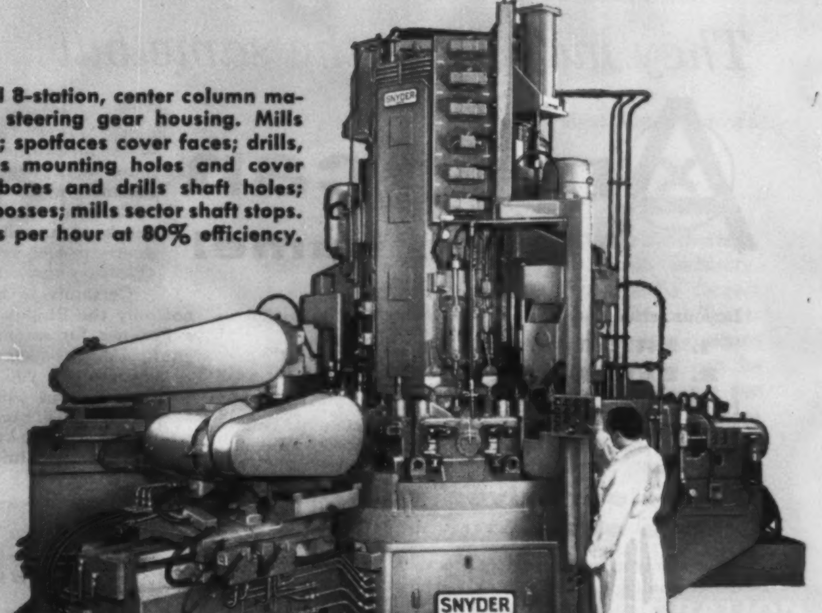
in engineering and building metal-cutting machines includes not only the great Snyder line transfer machines with automation, but also many smaller and diversified machines in which the standards of performance and economy are no less exacting. A few representative examples are shown.

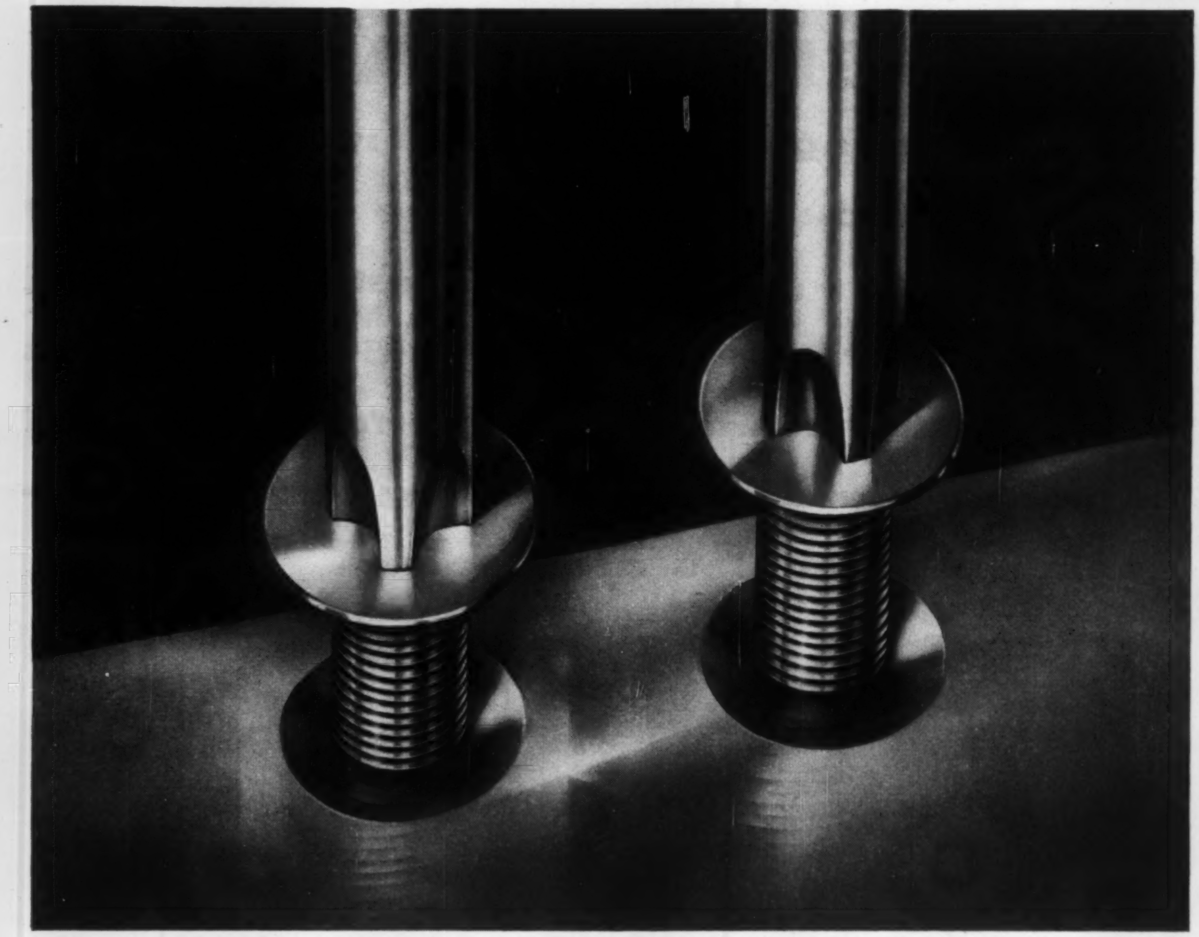
SNYDER

TOOL & ENGINEERING COMPANY
3400 E. LAFAYETTE • DETROIT 7, MICHIGAN

31 Years of Special Machine Tools with Automation

No. 72976½—Special 8-station, center column machine for processing steering gear housing. Mills pads and cover faces; spotfaces cover faces; drills, countersinks and taps mounting holes and cover holes; rough counterbores and drills shaft holes; mills two Welch plug bosses; mills sector shaft stops. Production 260 pieces per hour at 80% efficiency.





They may Look the same but...

American is the name!

In your actual cost of modern fasteners are four things:

1. PRICE **3. QUALITY**
2. SERVICE **4. RESEARCH**

It is possible, as prices fluctuate, there may be places you can get a price differential at the moment. But no one gives you more of all four plus features than American.

American gives you more of all four

Certainly in service, where precision American deliveries keep any production line on schedule — like an automotive manufacturer who uses more than 600 million American Phillips fasteners a year.

Certainly in quality where qualitative checks at American are unmatched in the industry in such key areas as raw material identification and evaluation.

Certainly in research that has developed not only the Phillips Head fastener, but devised a fastener for an appliance manufacturer that cut fastening costs more than 50%.

Nowhere will you find more of the four basic product features you want than from American — price, service, quality, research.

Like to know more about how this can save you important money? Then write:

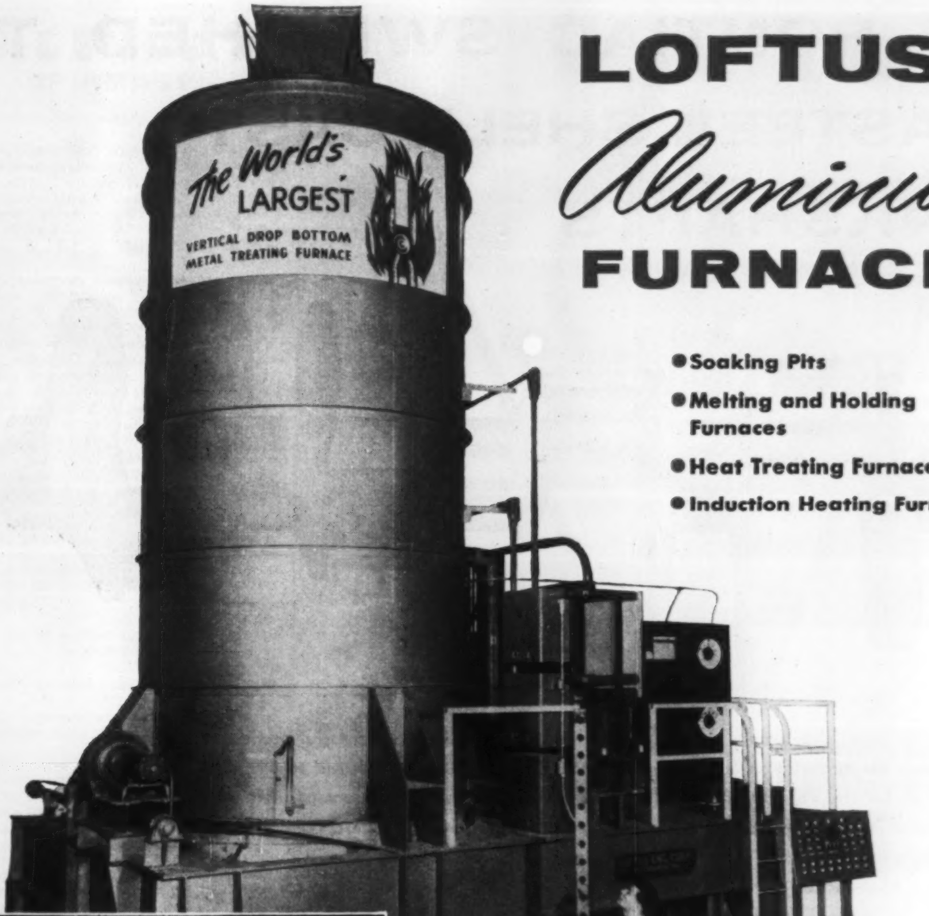
SINCE 1838

American!

AMERICAN SCREW CO. • WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICHIGAN

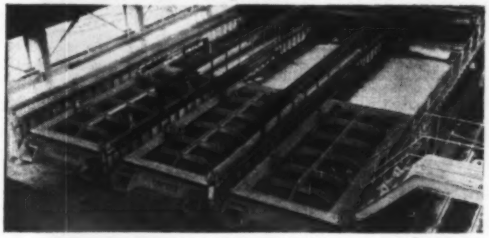
LOFTUS *Aluminum* FURNACES

- **Soaking Pits**
- **Melting and Holding Furnaces**
- **Heat Treating Furnaces**
- **Induction Heating Furnaces**



Drop Bottom Furnace

Melting Furnace



Soaking Pits

As designers and constructors of the most modern, efficient furnaces for the aluminum industry, Loftus recently completed the world's largest Vertical Travel Type Drop Bottom Metal Treating Furnace. Commenting on this ultra-modern installation, our customer says: "Loftus can be proud of pioneering this type of furnace for the metal treating industry." Whatever your furnace requirements, you can depend on Loftus for the best possible heating at the lowest possible cost.

Write today for complete details

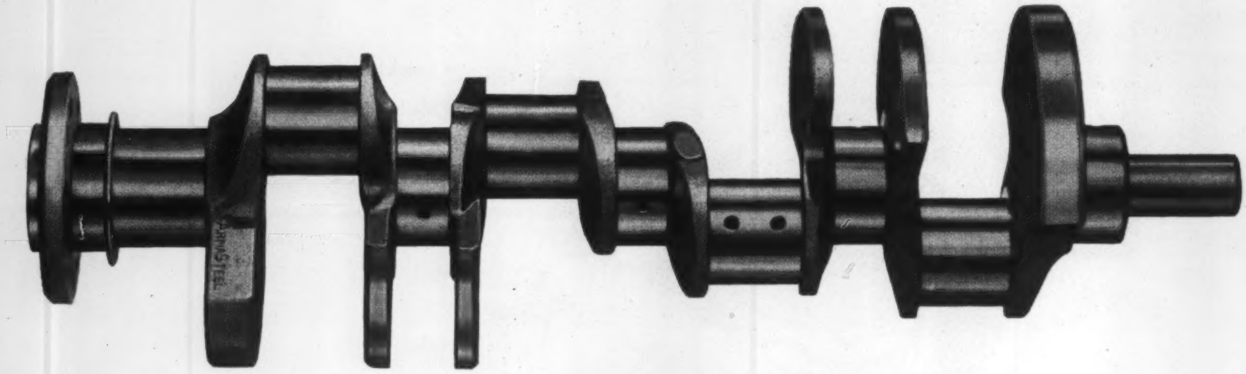
Loftus ENGINEERING CORPORATION

Designers and Builders of Industrial Furnaces

610 Smithfield Street, Pittsburgh 22, Pennsylvania

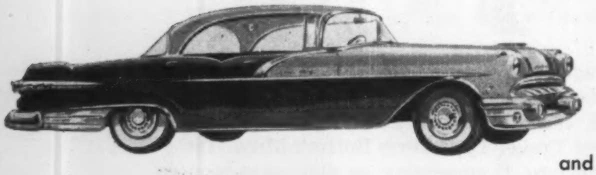
56.17.2-B

WHY PONTIAC SWITCHED TO ARMASTEEL SHELL-CAST CRANKSHAFTS



For many years automotive engineers have sought to produce a successful cast crankshaft. But either the material or the method of casting did not give the desired results. Now, however, Central Foundry Division has solved both problems by means of their tough pearlitic malleable iron, ARMASTEEL, and their perfected shell molding process. Pontiac Motor Division is the first of the great automobile manufacturers to capitalize on the advantages of the new ARMASTEEL crankshafts. After conducting a long and exhaustive series of tests in the laboratory and on the road, Pontiac is now installing shell-cast ArmaSteel crankshafts in all 1956 models.

ARMASTEEL, the metal, is a triumph of modern metallurgy that combines the advantages of both castings and forgings. Its resistance to fatigue and wear assures long life. Its rigidity results in minimum deflection and accurate alignment. Its high damping capacity allows it to absorb vibrant energy and thus contribute to noiseless operation.



The crankshaft made by the shell-mold process at Central Foundry results in substantial manufacturing savings. Because the castings are so close to the final finished dimensions, shell-cast ArmaSteel crankshafts are lighter and require considerably less machining and finishing. Shell molding also gives the engineer considerably greater latitude in design.

Many manufactured products can be improved and the costs lowered with shell-cast ARMASTEEL. If you are a manufacturer, engineer, production man or purchasing director, it will pay you to write us today for your copy of the book "ARMASTEEL" and the pamphlet "Shell Molding at Central Foundry."

CENTRAL FOUNDRY DIVISION

GENERAL MOTORS CORPORATION

SAGINAW, MICHIGAN · DEPT. 20

CALENDAR
OF MEETINGS

Apr. 9-11, American Institute of Mining & Metallurgical Engineers: Meeting of National Open-Hearth, National Blast Furnace, Coke Oven and Raw Material Committees, Netherland Plaza hotel, Cincinnati. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Apr. 9-12, American Management Association: Packaging conference, Convention Hall, Atlantic City, N. J. Association's address: 1515 Broadway, New York 36, N. Y. Vice president-secretary: James O. Rice.

Apr. 9-12, Society of Automotive Engineers Inc.: National aeronautic meeting, aeronautic production forum and aircraft engineering display, Hotel Statler, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Apr. 10-11, American Society of Mechanical Engineers: Machine design conference, Bancroft hotel, Worcester, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Apr. 10-12, Metal Powder Association: Annual meeting and show, Hotel Cleveland, Cleveland. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Apr. 12-17, National Association of Architectural Metal Manufacturers: Annual meeting, Belleview-Biltmore hotel, Belleair, Fla. Association's address: 228 N. LaSalle St., Chicago 1, Ill. Executive secretary: William N. Wilson.

Apr. 15-19, American Hardware Manufacturers' Association: Spring convention, Roosevelt hotel, New Orleans. Association's address: 342 Madison Ave., New York 17, N. Y. Secretary-treasurer: Arthur Faubel.

Apr. 16-17, American Society of Mechanical Engineers: Gas turbine power conference, Hotel Statler, Washington. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Apr. 18-19, Bituminous Coal Research Inc.: Annual meeting, Deshler Hilton hotel, Columbus, O. Association's address: 804 Southern Bldg., Washington, D. C., Secretary: C. A. Reed.

Apr. 18-19, Armour Research Foundation of Illinois Institute of Technology: National industrial research conference, Sherman hotel, Chicago. Foundation's address: 10 W. 35th St., Chicago 16, Ill.

Apr. 19-21, Gas Appliance Manufacturers Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 60 E. 42nd St., New York 17, N. Y. Secretary: Harold Massey.

Apr. 22-24, National Tool & Die Manufacturers Association: Spring board meeting, Hotel Statler, Washington. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

Apr. 22-26, American Ceramic Society: Annual meeting, Hotel Statler, Columbus, O. Society's address: 4055 N. High St., Columbus 14, O. Secretary: Charles S. Pearce.

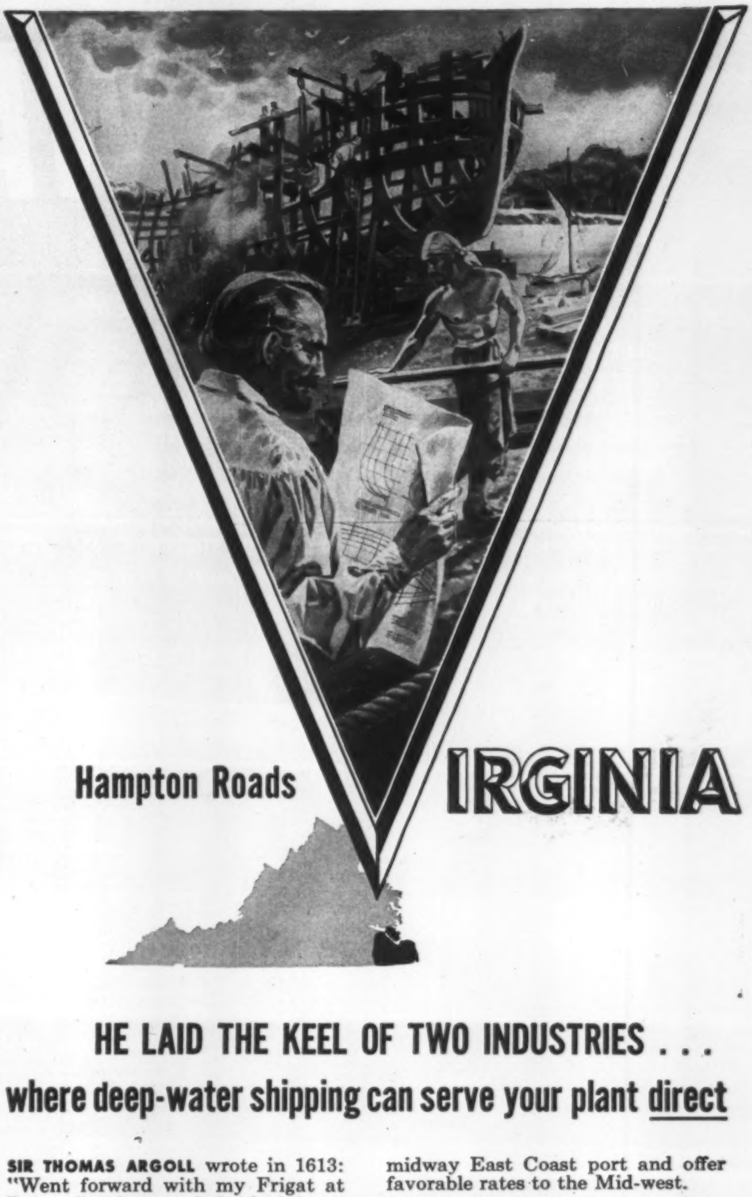
Apr. 23-25, American Zinc Institute and Lead Industries Associations:, Combined annual meeting, Hotel Statler, St. Louis. Information: Robert L. Ziegfeld, 420 Lexington Ave., New York 17, N. Y.

Apr. 26-27, Society for Advancement of Management: Management engineering conference, Hotel Statler, New York. Society's address: 74 Fifth Ave., New York 11, N. Y.

Apr. 29-May 3, Electrochemical Society: Spring meeting, Mark-Hopkins hotel, San Francisco. Society's address: 216 W. 102nd St., New York 25, N. Y. Secretary: R. M. Burns.

Apr. 30-May 2, Association of Iron & Steel Engineers: Spring meeting, Lord Baltimore hotel, Baltimore. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

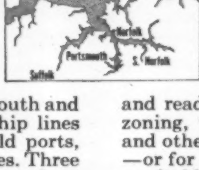
Apr. 30-May 2, Metal Treating Institute: Spring meeting, Roosevelt hotel, New Orleans. Institute's address: 271 North Ave., New Rochelle, N. Y. Secretary: C. E. Herington.



HE LAID THE KEEL OF TWO INDUSTRIES . . .

where deep-water shipping can serve your plant direct

SIR THOMAS ARGOLL wrote in 1613: "Went forward with my Frigat at Point Comfort, and finished her." She was the first big ship built in this country, and her first voyage was "for getting fish." Shipbuilding and fishing are still important to Virginia's Hampton Roads area, where a varied industrial output now totals $683,000,000 a year.



IF YOUR PLANT CAN PROFIT by a deepwater site, you will find the finest at Newport News, Norfolk, Portsmouth and South Norfolk. Over 300 ship lines link the harbor to 286 world ports, with sailings every 90 minutes. Three airlines, 9 major railroads and 45 truck lines serve this magnificent midway East Coast port and offer favorable rates to the Mid-west.

MANPOWER AND MATERIALS are abundant. Here, coal, chemicals, pulpwood, lumber, peanuts, soybeans and other raw materials roll up to your plant at short-haul cost.

AMPLE ELECTRICITY at low cost flows from VEPCO's modern power network. Its generating capacity expanded by 300,000 new kilowatts in 1955, with another 300,000 under construction and ready soon. For facts on taxes, zoning, water, natural gas, climate and other plus factors for your plant—or for confidential help in locating a suitable site, write or phone VEPCO, serving THE TOP OF THE SOUTH.

VIRGINIA ELECTRIC and POWER COMPANY

Clark P. Spellman, Director—Area Development
Electric Building, Richmond 9, Virginia • Phone: 3-4261

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Experienced Assembly Engineer. Successful record of effecting substantial assembly savings in 7 out of 10 cases. Will check your fastening problems and make specific recommendations for reducing assembly costs. Trained to fit the right screw to the right job. Works best when product is in design stage. Can also replace slow, costly assembly techniques with the fast, effective P-K® method without disturbing production routine. For complete details, call your local Parker-Kalon distributor. No cost or obligation.

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Call in a P-K Assembly Engineer and find out how you can profit through reduced assembly costs the P-K way. Take advantage of this unique Parker-Kalon service—another of the many reasons why users say—"if it's P-K . . . it's O. K."

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offers you

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One of the greatest values of a Niagara Power Squaring Shear is the unequaled experience of its builder. Niagara has been making shears for more than 75 years . . . by far, the longest of anyone in the industry.

Today, as in the past, the oldest name in shears stands also for the most modern in shear design. Niagara has continually set the pace in offering the most of **things which count the most** in dependable shear performance.

... YOU GET THE MOST IN ACCURACY:

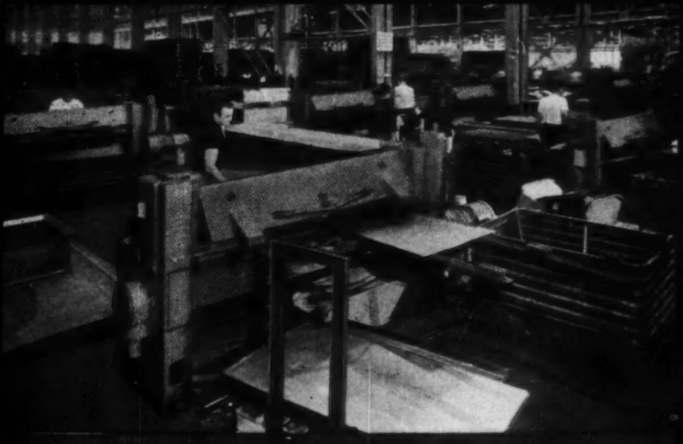
- With the cutting line fully visible, the positive power actuated, self-compensating holddown grips work securely. Multiple pressure feet on 6″ centers apply uniform pressure, contacting the work with low impact to safeguard material and bed against damage. Long or short work is held tight against the bed. There's no rippling of the sheet as the keen edged, low-sloped upper knife shears through . . . clean and smooth.
- Niagara's fully closed box section construction of bed, crosshead, holddown and housings plus ample and accurately held crosshead guides resist horizontal, vertical and torsional stresses with minimum deflection.
- Edges are trimmed straight and true within micrometer tolerances. Blanks, too, are cut accurately to size and shape without making compensating allowances when setting gages. Only a Niagara Shear possesses **all** of the necessary features to insure maximum accuracy!

YOU GET THE MOST IN SPEED:

- More working strokes delivered per minute and instant engagement of the Niagara Sleeve Clutch assure more cuts per hour. In continuous feed shearing, quick release of the power driven holddown enables a strip to be cut at each stroke.
- There's no need to adjust knife clearance every time a different thickness of stock is cut. Individual holddown feet are self-compensating. Two sheets of different thicknesses can be cut at the same time with the same knife adjustment and with the same accuracy.
- Ease of operation, quick setting gages and confidence inspired by safety features further increase hourly output . . . and make a Niagara Shear a truly productive, profitable investment for you!

YOU GET THE MOST IN THRIFTY PERFORMANCE:

- Simplicity of design, involving a minimum number of parts, cuts out costly maintenance. With less to go wrong, there's less to repair and replace.
- Vital parts of Niagara's driving mechanism (clutch, gearing, flywheel, eccentrics and detent) operate in enclosed oil-tight cases. Ideal lubrication and maximum safety are thus insured.
- With power transmitted from the drive through efficient spur gears and Niagara's instant engaging, multiple-point sleeve clutch, there are no sliding surfaces (such as in worm gears and friction clutches) to consume power, generate heat and wear rapidly.
- Niagara 4-cutting-edge knives, manufactured entirely within the Niagara plant, are uniformly tough to withstand hard usage and are promptly available.



Niagara Shears at work in large plant of one of the major electrical appliance manufacturers.

MOST EXACTLY SUITED TO YOUR NEEDS, TOO!

To fit your requirements exactly, consult a Niagara representative. With over 7 dozen models available in capacities from shim stock to 1″ mild steel and in cutting lengths from 3 to 24 ft., he'll be able to recommend the shear that's **right** for you.

ILLUSTRATED, FACT-FILLED BULLETIN 69 MAILED FREE ON REQUEST

It will give you detailed information on the complete, modern line of Niagara Underdrive Squaring Shears. Write for your copy today.

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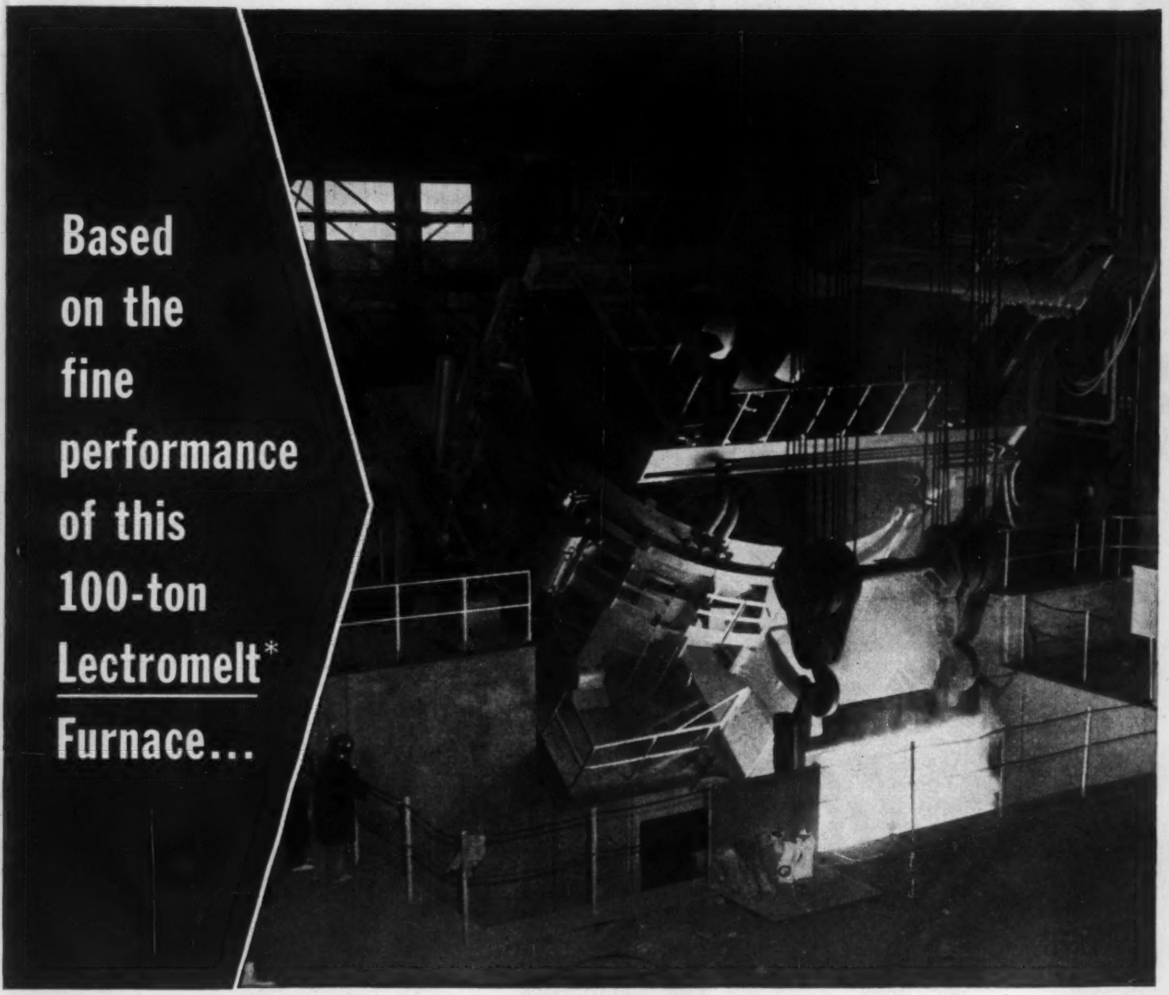

Based on the fine performance of this 100-ton Lectromelt* Furnace...

this large Midwestern steel company has ordered a second

LECTROMELT FURNACES continue to turn in excellent records of production. The precise control possible with these furnaces contributes to greater uniformity of steels and more accurate alloying. Lectromelt's system of top-charging speeds up output and reduces costs.

Thirty-seven years of experience, engineering and research qualify Lectromelt engineers to build electric-arc furnaces to meet your exact melting needs. Catalog No. 9-A describes these furnaces. Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pa.

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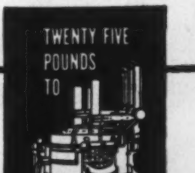
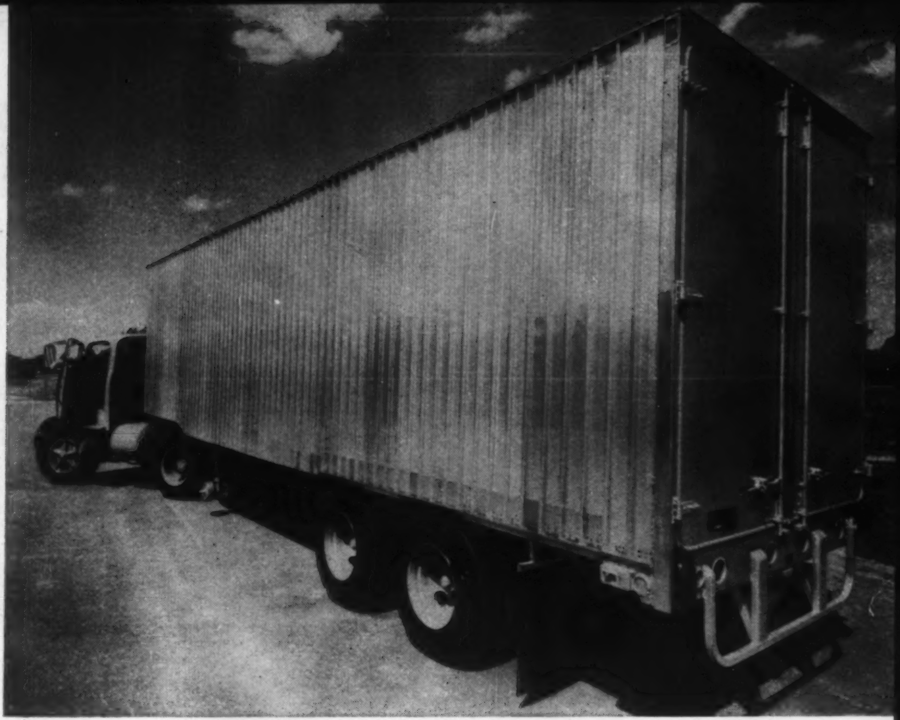


*REG. T. M. U. S. PAT. OFF

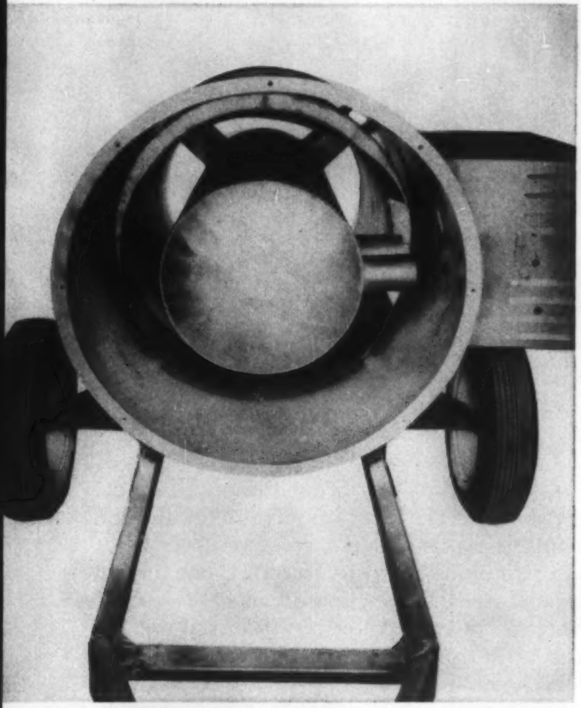
MOORE RAPID

WHEN YOU MELT... **Lectromelt**

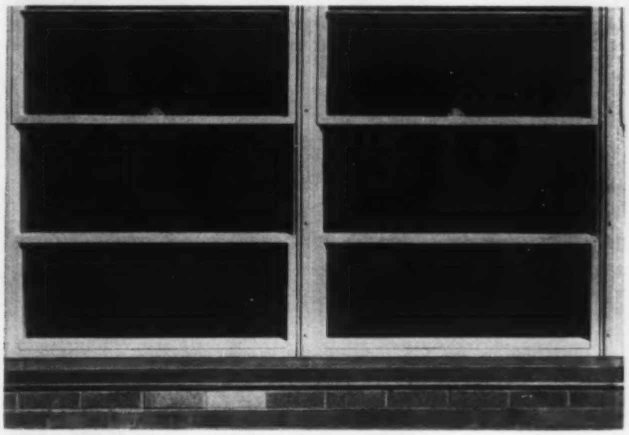


FOR TRAILERS THAT DO NOT WEAR OUT. This Fruehauf trailer has sides made from thin sheets of Stainless Steel, corrugated into walls that are only one inch thick. That's why it can carry more cargo than trailers of other, heavier types of construction. Most joints are welded, an easy job with Stainless. There is nothing to corrode or loosen; in fact, no Stainless trailer has ever worn out!

NOTHING *can equal Stainless Steel*



FOR HEAT RESISTANCE. This is a Lennox Crop Dryer. It burns 12 gallons of fuel oil per hour and has an input of 2,000,000 BTU. Wherever the heat is most intense, type 430 Stainless Steel is used. It is especially important for the combustion chamber and emitting tubes.



FOR ARCHITECTURAL USE. This Dawson Floating Sill is made from type 302 Stainless Steel. It combines fine appearance with the enduring properties of Stainless Steel. The finished job is neat and trim, and it will last as long as the building.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
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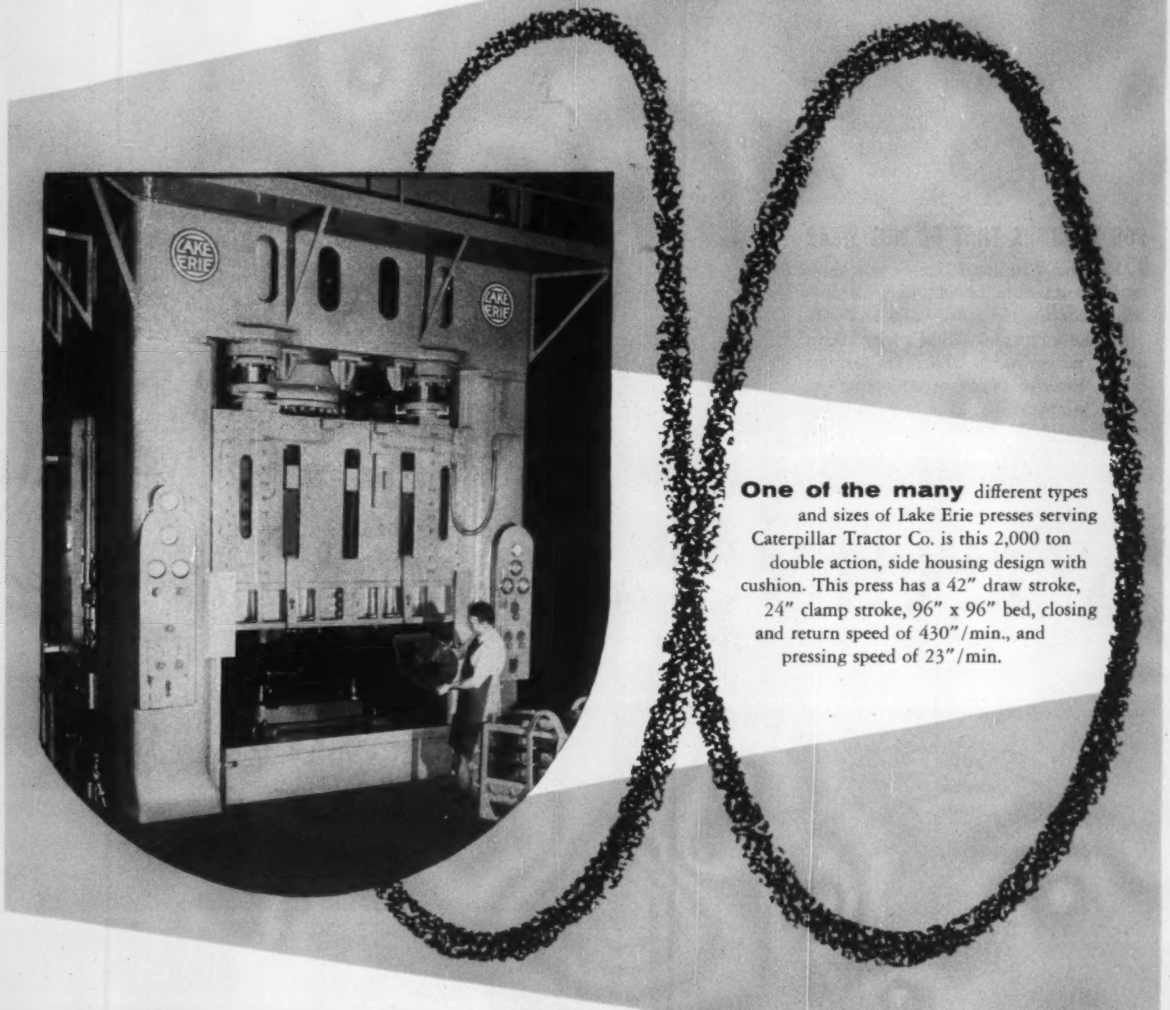
REPEAT ORDERS TELL THE STORY

of Customer Satisfaction with Lake Erie



One of the many different types and sizes of Lake Erie presses serving Caterpillar Tractor Co. is this 2,000 ton double action, side housing design with cushion. This press has a 42" draw stroke, 24" clamp stroke, 96" x 96" bed, closing and return speed of 430"/min., and pressing speed of 23"/min.

CATERPILLAR TRACTOR CO.

has re-ordered Lake Erie presses more than **20 TIMES**

Caterpillar Tractor Co. placed its first order for a hydraulic press in 1947. Today, some of the most important production operations in Caterpillar's plants are performed on Lake Erie presses. These operations include drawing, blanking, hot forming, bending, bulldozing and others. Like Caterpillar Tractor Co., many other of the great names in American industry use Lake Erie presses for a multiplicity of production jobs.

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"TRICLENE® D cut our downtime by two-thirds," says E. Owen, KIRSCH COMPANY

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This new booklet brings you all the latest data on the processes and procedures used in vapor degreasing. In 42 fact-filled pages, you get a well-illustrated and documented story of new developments in vapor degreasing. Here are some of the subjects covered:

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- **Applications**
- **Cleaning by Ultrasonics**
- **Vapor Degreasing Costs**
- **Safe Handling of Solvents**

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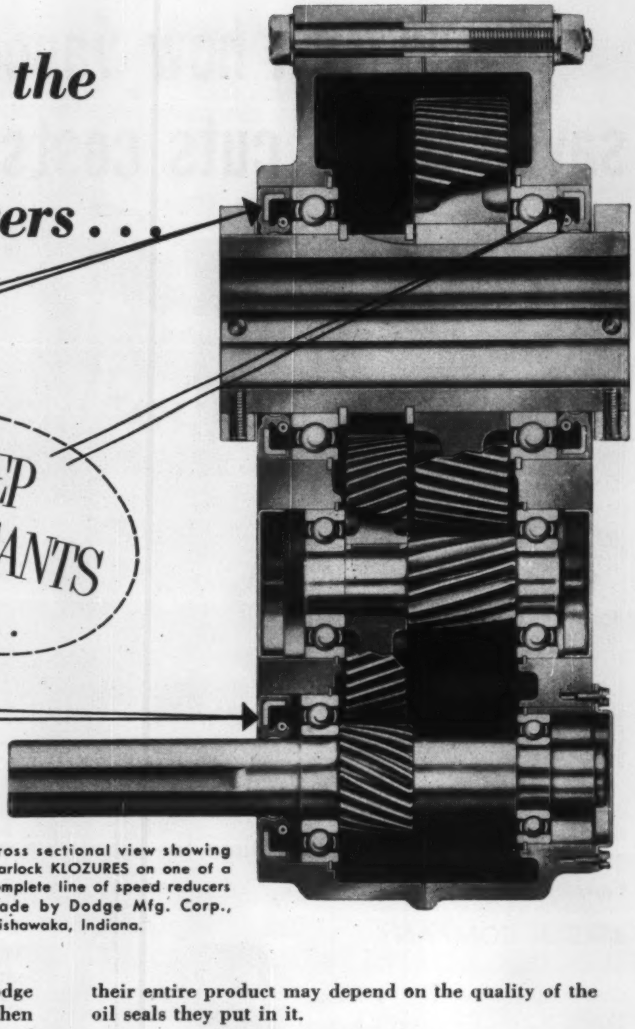
KEEP DIRT OUT . . .

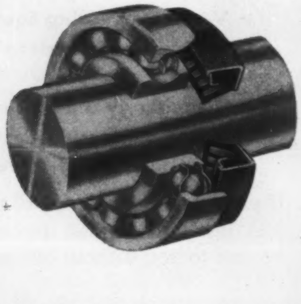
KEEP LUBRICANTS IN . . .

WITH **KLOZURE*** **Oil Seals**



Cross sectional view showing Garlock KLOZURES on one of a complete line of speed reducers made by Dodge Mfg. Corp., Mishawaka, Indiana.

Makers of such fine precision products as The Dodge Torque-Arm Speed Reducer will not compromise when specifying oil seals. They know that the reputation of their entire product may depend on the quality of the oil seals they put in it.



Model 53 finger spring KLOZURE for normal and high speed service, applied to a shaft to protect the ball bearing.

Think about this the next time you have occasion to specify oil seals, and we think you'll choose Garlock KLOZURE Oil Seals—guaranteed to do the job you specify with minimum power loss and heat generation.

KLOZURES are available in a complete range of types and sizes. Therefore, be sure to call in one of Garlock's 125 trained sales engineers right at the start. His experience will save you time and money. Or, write today for Catalog No. 10.

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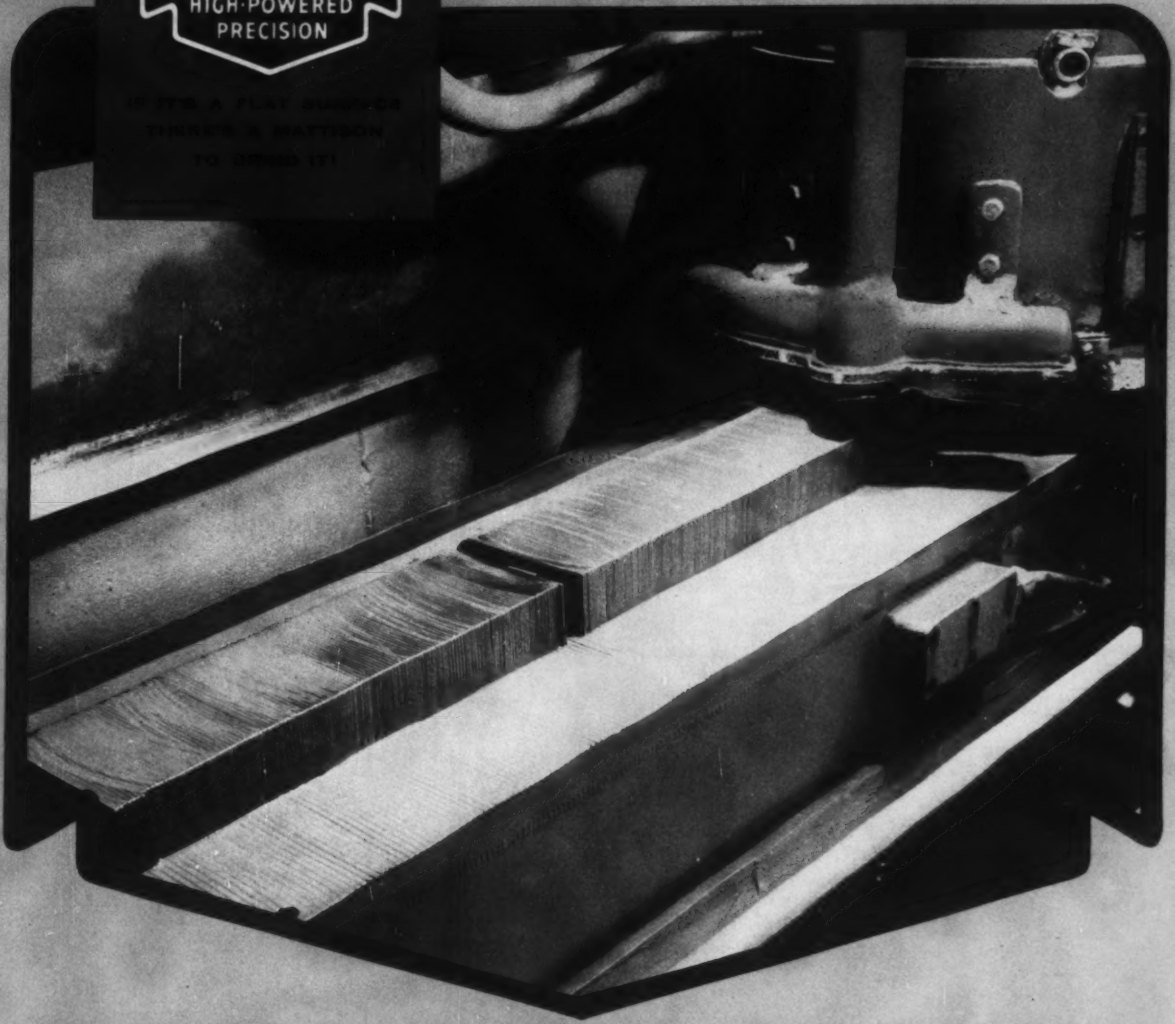
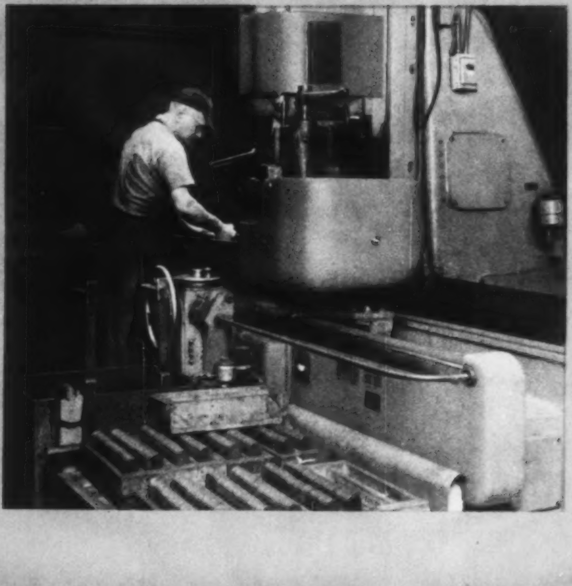
THERE'S A MATTISON
TO GRIND IT!



GRINDING METHODS

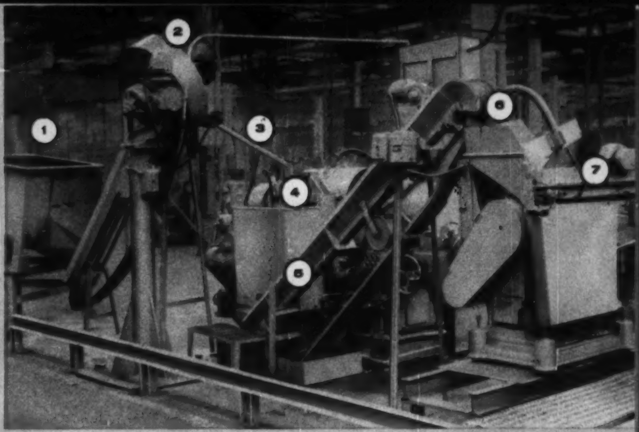
Save setup time and machine time edge grinding on the Mattison No. 300

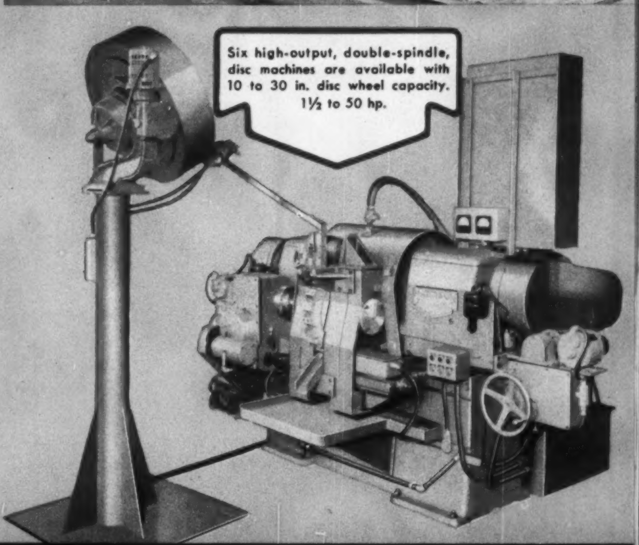
Mattison Model 300 Vertical Spindle Surface Grinders slashed setup time from 9 manhours to ½ manhour, and now *four* machines do the work of *eight* at this tool manufacturer's plant. Hardened blades for carpenter planes are ground at a rate of 1750 per hour with a definite increase in accuracy, drastic reduction in maintenance costs, and reduction in grinding wheel costs. Mattison Vertical Spindle Grinders are designed for the accurate generation of flat surfaces. Fine increment feeds and close limits of accuracy are possible because the wide, extra-heavy vertical column is one solid piece, bolted to the base. Flat and vee column ways are longer, wider, and thicker, thus preventing any binding of the head slide. Send for Bulletin No. 847.



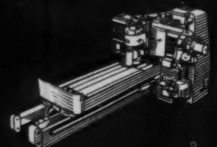
Standard machine meets automatic requirements . . . grinds more than 1300 pins per hour, both ends

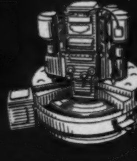
Automatic operation of this Mattison No. 221 Double-Spindle Disc Grinder machines both ends of piston pins for six and eight cylinder car and truck engines at a rate in excess of 1300 pieces per hour. Installed in a large automotive plant, this accurate, high-output grinder keeps ahead of the production line as automatic loading and sizing devices call for minimum attention from the operator. These sizing devices gauge the work continuously. When grinding wheels wear so that pins approach the high limit of tolerance, the automatic feed is actuated to compensate for wear. Tolerances are consistently within specifications, and finish is 20 micro inch. Numbers on the illustration will help you trace sequence of operations: 1) hopper for rough pins; 2) stacking drum which aligns pins; 3) conveyor carrying pins into grinder; 4) grinding station (both ends finished at once); 5) belt conveyor; 6) loading hopper for next operation; 7) conveyor for lining pins end to end for centerless grinding of outside diameter. These versatile double-spindle disc grinders may solve a production problem for you. Send for Bulletin No. 647. (No. 221 Double-Spindle Disc Grinder).

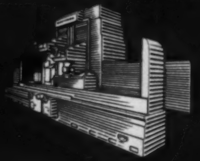


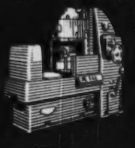


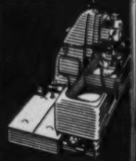
Six high-output, double-spindle, disc machines are available with 10 to 30 in. disc wheel capacity. 1½ to 50 hp.









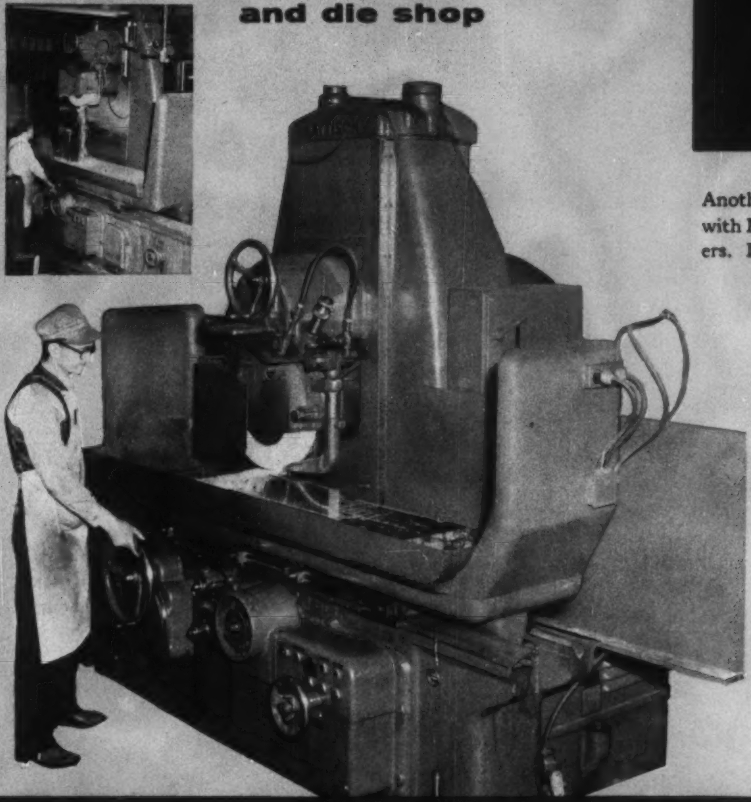


SELECT THE RIGHT GRINDER FOR YOUR JOB FROM MATTISON'S COMPLETE LINE OF

$3640 saved yearly by refinishing forging dies on Mattison 100 hp Surface Grinder

Heavy stock removal from these dies demands the high horsepower built into every Mattison.

Positive cutting action and high precision of Mattison Surface Grinder cuts costs for tool and die shop



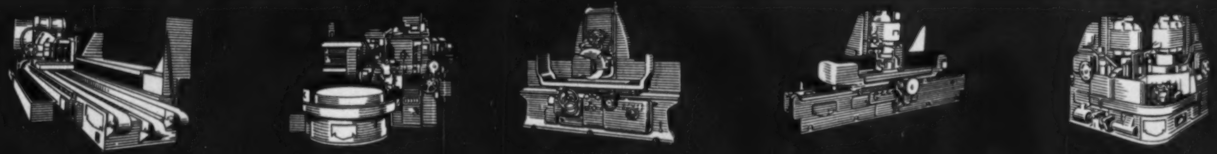
MATTISON

HIGH·POWERED PRECISION

GRINDING METHODS

Another tool and die shop reports excellent results with Mattison High-Powered Precision Surface Grinders. Installation of the first Mattison led to the purchase of the second, as it does so often. Versatility of the grinders, combined with ease of setup and precision performance, makes them ideal for the tool and die shop.

This user has discovered that improving the grinding operation has been equivalent to increasing productive capacity of the shop. With today's high volume of sub-contract work, including tool and die work, machine parts, and production jobs, the Mattison may be the answer to your problem of increasing capacity and profits. Send for a copy of "Setups," a book which describes the great variety of profitable work you can do on a Mattison. You will find this book extremely helpful in planning future work.

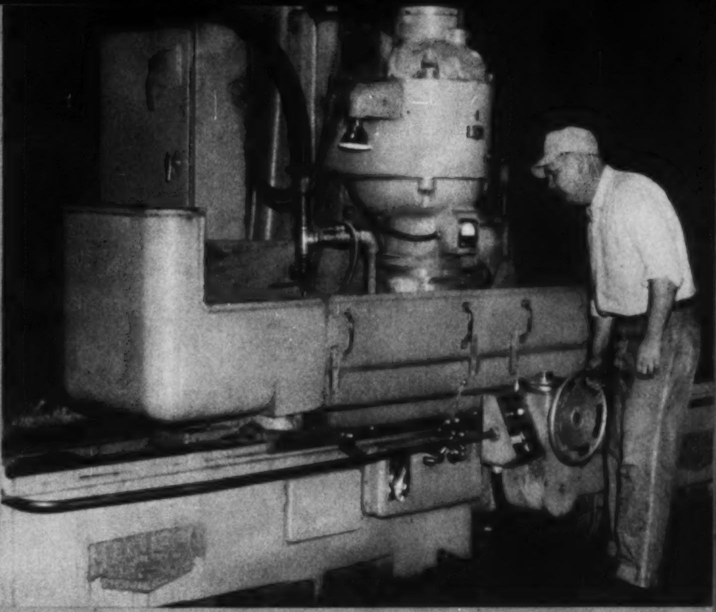


60 DIFFERENT MACHINES • SURFACE GRINDERS • FACE GRINDERS • DISC GRINDERS

Savings of $3640 in labor costs annually convinced this Mattison user of the wisdom of installing a Mattison Model 400SS Vertical-Spindle Surface Grinder for refinishing drop hammer forging dies used to work nickel alloy ingots into blooms, billets, or slabs. These tough nickel-chrome-molybdenum dies were formerly reworked on the planer where two dies could be machined simultaneously, with two changes in setup to finish the beveled corners. Highest production rate was four blocks per shift with grinding needed to remove tool marks. The Mattison has replaced the planer and increased production to an average output of seven die blocks per shift. Holding fixture allows beveled edges to be ground easily by tilting the die. Send for Bulletin No. 847.

Tilting fixture makes it easy to grind bevel on die without rehandling workpiece.

Ease of operation cuts production costs 15% . . . high power removes stock 20% faster



High speed tool bits are ground to tolerances of +.0005 in.

Production cost savings of 15 per cent through ease of operation are reported by this Mattison user. A Mattison Model 300 Vertical-Spindle Surface Grinder has the power to remove metal 20 per cent faster in the plant of a large manufacturer of tool steel products. This machine consistently meets precision requirements for tolerance and parallelism, and costs very little to maintain. Accuracy is assured on the Mattison 300 because of its rigid, one-piece column design, high horsepower, and built-in motor whose special shaft is the grinding wheel spindle. This spindle holds its adjustment, yet can be positioned quickly and accurately for the individual job. Exclusive Universal adjustment head slide mounting adds flexibility for handling a greater variety of work. Send for Bulletin No. 847.

IF IT'S A FLAT SURFACE . . . THERE'S A MATTISON TO GRIND IT!

New Surface Grinding Case Histories...

Attach this coupon to your letterhead, and mail today!

SEND . . . me my copy of

"Surface Grinding Case Histories" ☐
I would like the following bulletins: Bulletin No. 847 ☐
(Model 300 and 400 SS Vertical-Spindle Surface Grinder) ☐
Bulletin No. 647 (No. 221 Double-Spindle Disc Grinder) ☐
"Setups" (Surface grinder job descriptions) ☐

Name____________________

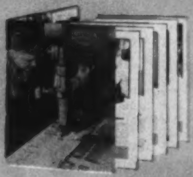
Title____________________

Company____________________

Address____________________

City__________ Zone_____ State__________

now available!



Mattison brings you authentic user reports demonstrating the versatility of surface grinding—newest method of metal cutting. High production with extreme precision are twin qualities to be found in almost every story. Many different products and materials are described in these reports.

MATTISON
MACHINE WORKS
ROCKFORD ILL. U.S.A.

**HIGH-POWERED
PRECISION
SURFACE GRINDERS**

**MATTISON MACHINE WORKS
ROCKFORD, ILLINOIS**

Wire rope lasts as long as the wire it's made of!

ROEBLING'S NEW ROPE WIRE

1105

HAS THE CAPACITY TO ENDURE...
AND

Royal Blue

WIRE ROPE
IS MADE OF 1105!

ROEBLING
Subsidiary of The Colorado Fuel and Iron Corporation

Write us for full facts on the all-steel Royal Blue Wire Rope, or contact your Roebling distributor

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

Sigma welding has made the repair of these large pump impellers faster and more economical. Finished welds are a sound, homogeneous bond.

Sigma Welding Saves $5,000 per unit

Speeds repair of world's second largest pumps . . .

During operation, giant 20 ton manganese bronze pump impellers like this one, suffer cracks ranging in size from small sand inclusions, to cuts over a foot long. By using sigma welding, it is now possible to make high quality, on the spot repairs without disassembling the units — this results in an immediate savings of 5,000 dollars per pump.

Shown above is a typical repair operation on one of the 22,000 hp. electric motor driven pumps. This crack is 11-in. long, 2½-in. wide, and 2-in. deep. The four pegs adjacent to the crack are strain check points. Frequent measurements made of the distance between them determines welding duration and the peening sequence necessary to control distortion which in this operation was less than 0.005 inch. The completed weld made with aluminum bronze wire has an excellent surface appearance and color match.

You can speed production and cut costs in your operations—find out more about sigma welding from your local LINDE representative . . . Start saving now, call him today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto
(formerly Dominion Oxygen Company)

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Linde
Trade-Mark

STERLING'S

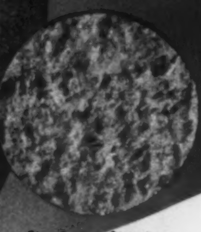
"STERDENSE"

SNAGGING WHEEL
FOR HEAVY PRESSURE GRINDING

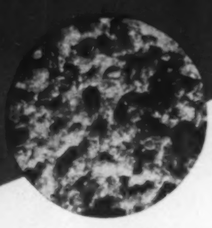
Provides an unusual abrasive structure to obtain superior steel mill grinding, especially for heavy pressures . . .

STERLING GRINDING WHEEL CO.
TIFFIN, OHIO

"Note the structural difference between STERDENSE and ordinary wheels."



Sterdense Structure



Ordinary Structure

Sterling's New Sterdense Grinding Wheel is now available to steel mill slab and billet departments. Based upon an idea that a tool, firmly held, will do more, better and faster, this new grinding wheel has an extra-dense, compact bond to hold the sharp, abrasive grains firmly and rigidly until *all* their cutting value has been used.

As a result, Sterling's New Sterdense Wheel offers more metal removal per minute, and at the same time, provides a cooler grinding, longer-lasting abrasive unit, for heavy pressure work.

A test of Sterdense in your billet or slab grinding department will quickly prove the startling advancement that has been made with this new Sterling product. Our abrasive engineers, skilled in the application of the Sterdense Wheel to steel mill grinding problems, will welcome your inquiry. Write or wire us today.

The entire Sterling grinding wheel line is described and priced in the new catalog No. 2-55. Send for it today.

"THE WHEELS OF INDUSTRY"
STERLING
ABRASIVES

STERLING GRINDING WHEEL CO., TIFFIN, OHIO

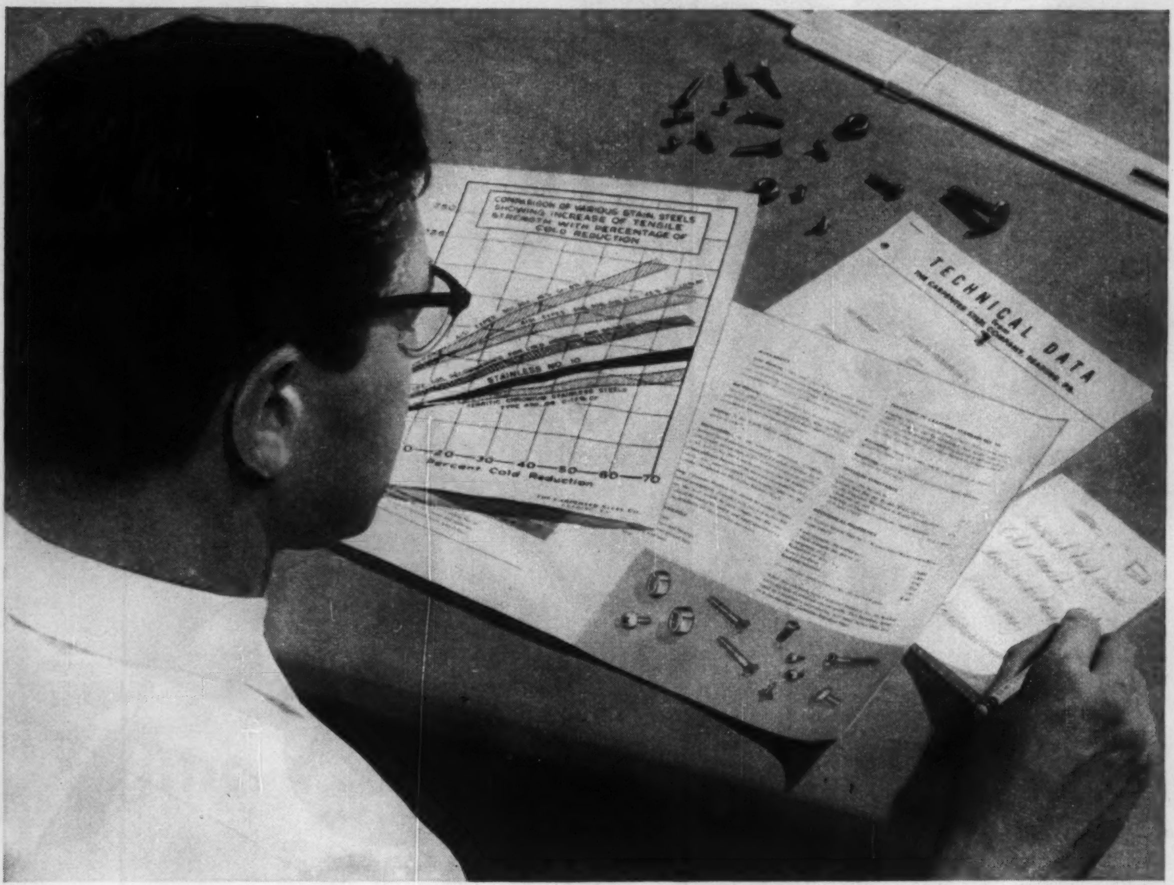
A SUBSIDIARY OF

ABRASIVE AND METAL PRODUCTS CO.

A&MP COMPANY

DISTRIBUTORS IN ALL PRINCIPAL CITIES

Carpenter... **pioneering in improved Tool, Alloy and Stainless Steels through continuing research**


COMPARISON OF VARIOUS STAIN. STEELS SHOWING INCREASE OF TENSILE STRENGTH WITH PERCENTAGE OF COLD REDUCTION
STAINLESS NO. 10
0—20—30—40—50—60—70
Percent Cold Reduction
TECHNICAL DATA

How Can You Improve Your Parts With This New, EASIER TO COLD WORK Stainless?

A new combination of properties in Carpenter Stainless No. 10 gives you greater flexibility in designing and fabricating cold formed parts than you get with any other type of chrome-nickel stainless.

Many chrome-nickel stainless parts which you previously considered too difficult or costly to cold head or upset on a mass production basis, can now be economically mass produced from No. 10 without process annealing. Its slower work hardening also makes No. 10 a "natural" for difficult coining, extrusion and swaging operations.

Also Carpenter Stainless No. 10 remains non-magnetic after severe cold working—an important advantage for instrument parts which must be non-magnetic after fabrication. And No. 10 possesses corrosion resistance equal to or better than standard chrome-nickel stainless steels.

If you have had difficulty in producing or obtaining such parts, perhaps this radically different chrome-nickel stainless will enable you to switch to cold forming . . . adding inherent benefits to your product.

Get the full story on No. 10. Talk it over with your Carpenter representative or write on your company letterhead.

Carpenter STEEL

stainless no. 10

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.
Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

. . . "the **PAYLOADER**®
came out way on top.
the two HA's with
roll-back buckets are
doing better than
⅓ more work than
machines without
roll-back action."

(Signed) WILLIAM MCCAIN, *Foreman*
Ohio Stove Company
Portsmouth, Ohio

Best for your operations too!

. . . "believe the new
model HA
PAYLOADER®
the best machine
for our operations."

(Signed) E. F. STOLPE, *Owner*
Penna. Malleable Casting Co.
Lancaster, Pa.

Foundries and metal-working plants far and wide are expressing their satisfaction with the performance of the new-design model HA "PAYLOADER". Built to scoop-up and carry more material for its weight than any tractor-shovel near its class, the new HA is way ahead of the field in the *kinds* of work it can do — in the *amount* of work it can do.

Torque-converter drive; full-reversing transmission; 40-degree bucket tip-back at ground; closed, pressure-controlled hydraulic system with built-in shock absorber . . . these are but a few of the many tried and proven plus values in the new HA that contribute to its leadership in performance, low maintenance and long life. Your Hough Distributor is eager to show you what the new HA or a larger "PAYLOADER" can do for you.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

For higher lifts and more production a bigger front wheel drive unit — model HAH 1 cu. yd. capacity.

THE FRANK G. HOUGH CO.
976 Sunnyside Ave., Libertyville, Ill.

☐ Send data on Model HA (18 cu. ft.)
☐ Send data on Model HAH (1 cu. yd.)
☐ On larger models up to 2 cu. yd.

Name
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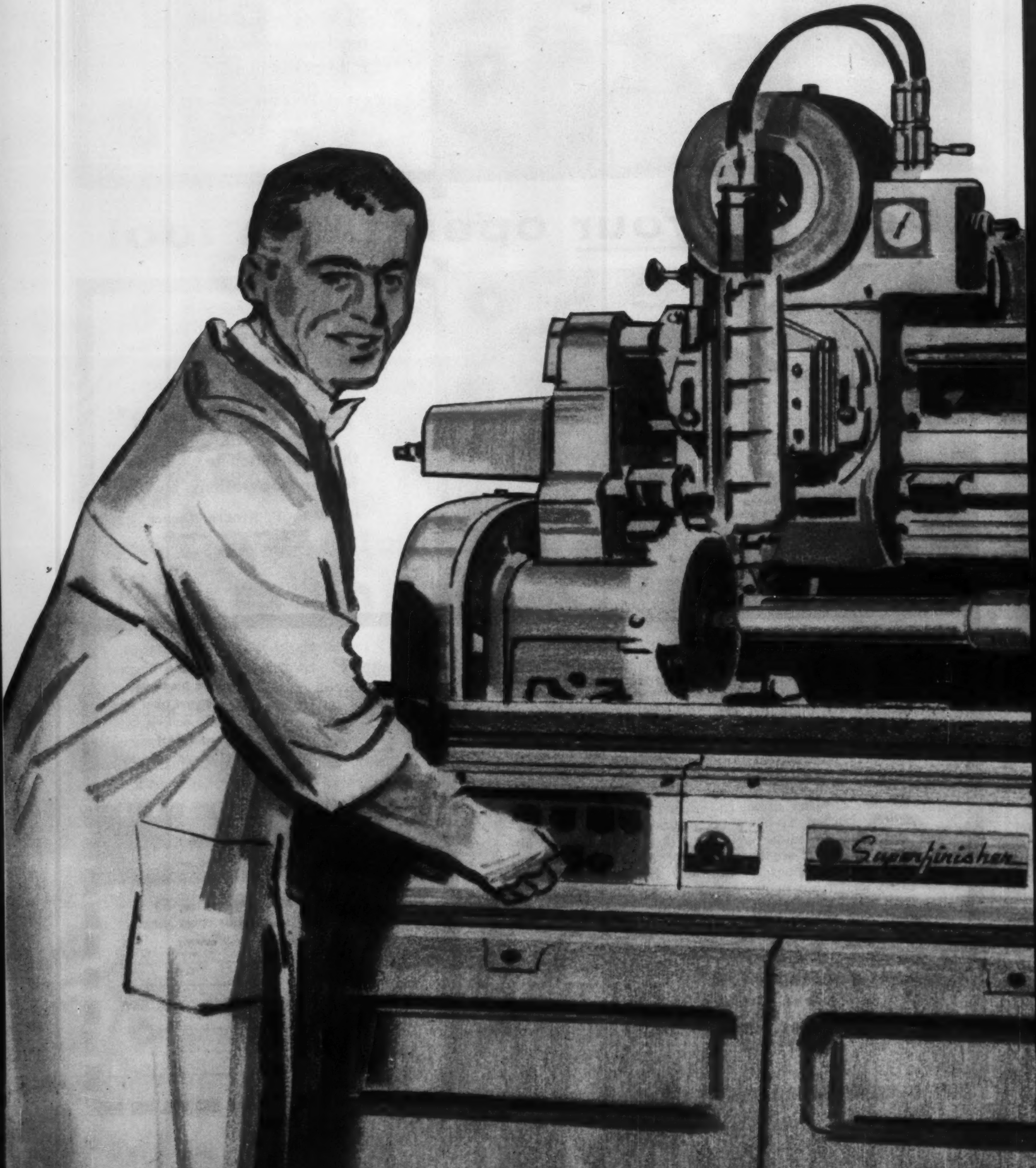
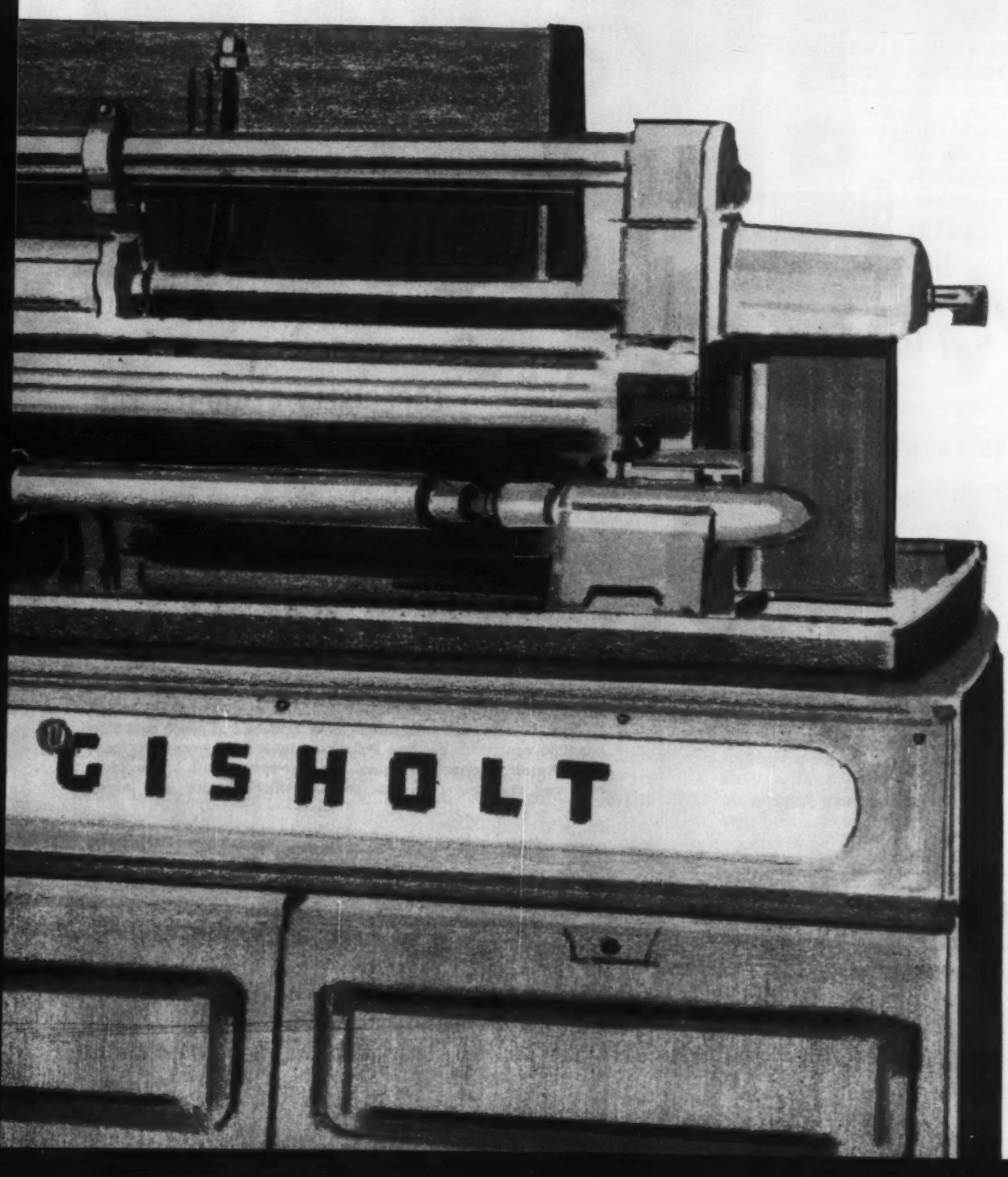

Superfinisher

GISHOLT MASTERLINE 52A SUPERFINISHER

MASTERLINE
GISHOLT SINCE 1887

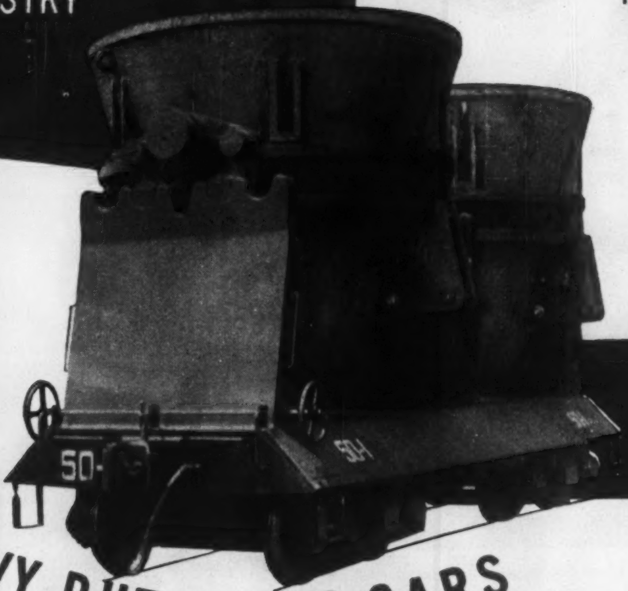
The Superfinishing process is recognized as one of the most important contributions to modern metalworking. Now—in this new 52A MASTERLINE Superfinisher—Gisholt offers an outstanding machine for either small job-lot work or high production runs. Other general purpose and high production models complete the line. Let us give you the complete facts on how Superfinishing may be profitably applied to your manufacturing processes—plus full details on the complete line of Gisholt Superfinishing Machines.

Gisholt Machine Company, Madison 10, Wisconsin
Look ahead—keep ahead—with Gisholt



POLLOCK

LEADING CINDER AND SLAG CAR
BUILDERS FOR THE IRON AND
STEEL INDUSTRY



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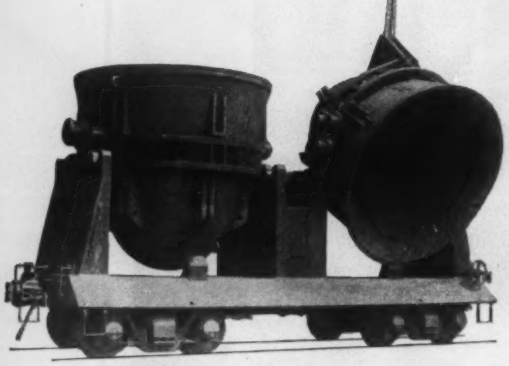
HEAVY DUTY SLAG CARS

ESPECIALLY DESIGNED FOR TODAY'S OPEN HEARTH OPERATION



● Note the heavier construction used in every detail of this double-pot, crane-dumped car. This extreme ruggedness is a necessity to assure longer life and trouble-free service under present-day big-tonnage production.

In addition to the more sturdy construction, design features contribute to open hearth operational advantages. The unit is unusually compact and permits use with minimum allowances for space clearances. Simplicity of structure reduces maintenance time and retards deterioration. Cradle arrangement permits easier, faster dumping from either side.

Each pot holds 400 cubic feet which provides 800 cubic feet slag disposal capacity within 29'0" coupler to coupler.

Most new open hearth plants have Pollock hot metal and slag handling equipment because Pollock engineering is geared to mesh with overall efficiency planning. Also for open hearth ladles, ingot cars and charging box cars, consult Pollock before you invest.

POLLOCK
SINCE 1863

THE WILLIAM B. POLLOCK COMPANY
YO[illegible]GSTOWN · OHIO
STEEL PLANT CONSTRUCTION · ENGINEERS · FABRICATORS · ERECTORS

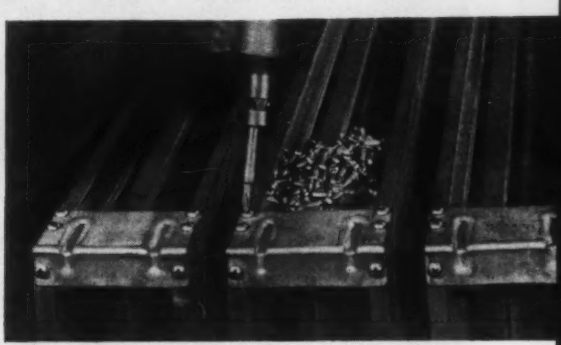
BLAST FURNACES • HOT METAL CARS AND LADLES • CINDER AND SLAG CARS • INGOT MOULD CARS • CHARGING BOX CARS • WELDED OPEN HEARTH LADLES

Greater Production - Neater Installation with

PHILLIPS CROSS RECESSED HEAD SCREWS

"OUR PRODUCTION INCREASED 50%, and probably even more since the use of power drivers made possible by Phillips head screws," says the Plant Manager of Yankee Metal Products Corporation of Norwalk, Connecticut. Phillips screws have also eliminated damage and have facilitated the ready replacement of signal lenses.

LINCOLN, division of the Ford Motor Company, uses Phillips Cross-Recessed-Head Screws in the construction of the luxurious Lincoln automobile. The picture above shows Phillips screws being easily installed in the windshield wiper motor of the Lincoln.



"PHILLIPS SCREWS HAVE REWARDED US with increased production, ease of operation, elimination of damage due to screw driver slippage, longer tool life, more attractive appearance, more positive gripping and more secure fastening," states Mr. Solar, plant manager of Fleet of America, Inc., makers of quality aluminum prime windows and doors.

MANUFACTURERS OF PHILLIPS CROSS-RECESSED-HEAD SCREWS

THE FASTENERS OF TODAY...
AND OF THE FUTURE
✕ *marks the spot*
the mark of extra quality

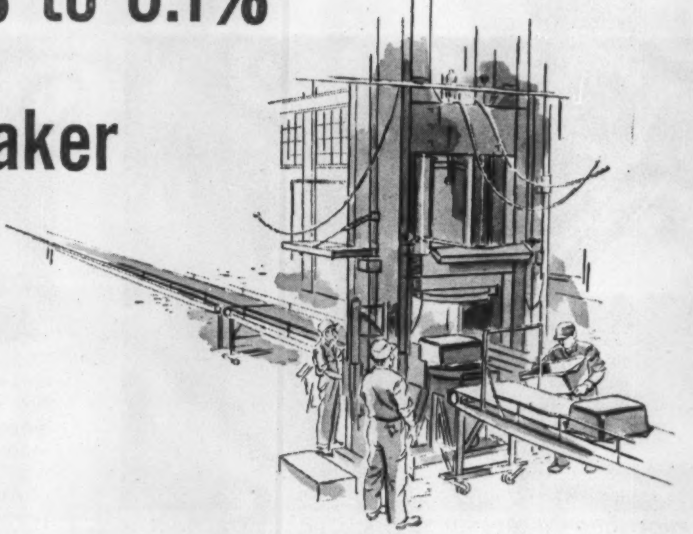
Pledged to highest standards...

The Phillips Screw manufacturers listed here cooperate to turn out a uniformly high standard of quality. As sponsors of the Phillips Cross-Recessed-Head Standards Committee they adhere to the established dimensional standards, gauges, and gauging methods which will best serve industry.

Members of Screw Research Association

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation Pheoll Manufacturing Co. • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company • Sterling Bolt Company • Wales-Beech Corporation

Deep-draw rejects cut from 10% to 0.1% when sink maker switches to Pennsalt drawcote



SOME BENEFITS OF USING DRAWCOTE AND OTHER FOS PROCESS CHEMICALS

CONSISTENT RESULTS. The uniform, fast-drying immersion coating, unlike wet lubricants applied at each press stage, covers the stock completely and with the correct lubricating thickness, usually remaining for two or three press stages.

INCREASED DIE LIFE. Dies forming metal coated with Pennsalt FOS lubricants are protected from galling and welding, last substantially longer and require much less upkeep than dies worked with wet lubricants.

SIMPLIFIED STORAGE. DRAWCOTE®, FOSCOAT®, and FOSLUBE® can be applied well ahead of the drawing or stamping stage—even by the metal-stock supplier—and blanks can be stored ready for use at any time. No need to recoat before forming.

A BETTER START FOR YOUR FINISH. Easily cleaned off *at any time* before the finishing process, Pennsalt FOS lubricants leave no oil films or smuts to mar plated, vitreous, or organic finishes. Costs come down all along the line.

TRUE STORY: One manufacturer of steel kitchen sinks cut his deep-draw reject rate of ten to fifteen percent down to the negligible rate of *one in a thousand*—simply by switching from wet drawing compounds to dry, uniform DRAWCOTE.

DRAWCOTE eliminated this manufacturer's need to clean drawn parts before welding together. Improved shop cleanliness was immediately apparent. And the production line's worst bottleneck was cleared up.

LEARN THE FACTS — find out what other deep-draw and cold-forming shops are accomplishing with the Pennsalt FOS PROCESS of specialized lubricants. Ask your Pennsalt service man or write Metal Processing Dept. 270, Pennsylvania Salt Manufacturing Company. East: Three Penn Center Plaza, Philadelphia 2, Pa.; West: Woolsey Bldg., 2168 Shattuck Ave., Berkeley 4, Calif. In Canada: Pennsalt Chemicals of Canada, Hamilton, Ontario.

Pennsalt Chemicals

Metal Cleaners • Phosphate Coatings • Cold-Working Lubricants

A BETTER START FOR YOUR FINISH

Cutting 4 risers per minute...

Lightweight and easy to handle, this Oxweld powder-cutting blowpipe makes fast work of risers.

Powder-Cutting speeds removal operations 300%

Removing risers from stainless steel castings need no longer be costly and time consuming. Pictured above is a typical powder-cutting operation at the Ohio Steel Foundry Company, Springfield, Ohio. Here, 2 by 4 inch thick stainless steel risers are removed by powder-cutting in only 15 seconds. By methods previously used, this operation took up to four times longer.

In the powder-cutting process metal powder is automatically injected into an oxygen flame to increase the flame's heat and severing action speed. The powder process is helping users gain new efficiency and speed in the removal of gates and risers, sand incrustations, and casting defects.

The powder-cutting blowpipe used in this operation, an Oxweld AC-4, is designed for hand cutting of oxidation resistant metals such as stainless steel, chrome alloys, and cast iron. Heavier apparatus is also available for manual and mechanized operations.

Increase your production and profit—call your local Linde representative, or write for illustrated literature on Linde's modern processes. Start saving now, do it today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

Linde
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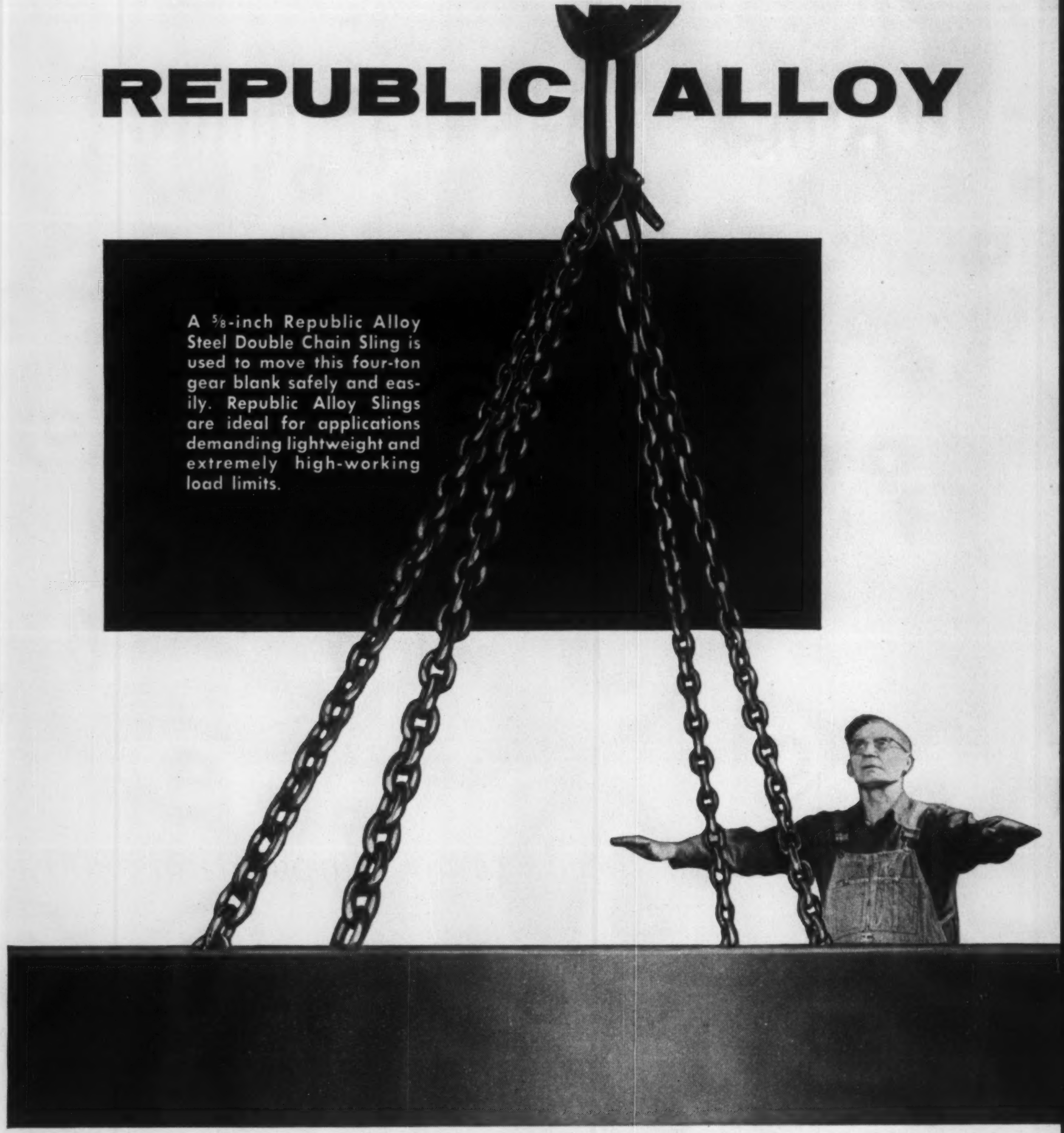
REPUBLIC ALLOY



A ⅝-inch Republic Alloy Steel Double Chain Sling is used to move this four-ton gear blank safely and easily. Republic Alloy Slings are ideal for applications demanding lightweight and extremely high-working load limits.

REPUBLIC

REPUBLIC STEEL ®

World's Widest Range of Standard Steels

STEEL CHAIN SLINGS

Are Safe, Strong, Lightweight, Easy to Handle

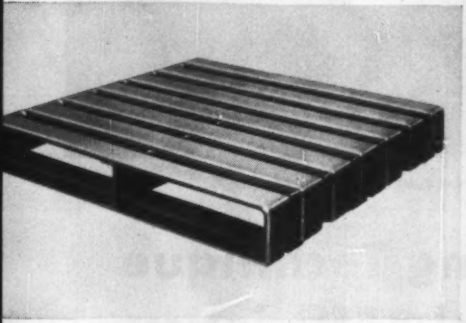
For hazardous, heavy-duty lifting and overhead materials handling, nothing exceeds the modern chain sling made from *alloy steel.* This means it is one of the safest, strongest and toughest pieces of equipment you can have around the shop.

Republic enters the alloy chain sling picture in three ways. (1)—Republic is the world's largest producer of alloy steels. (2)—The high strength-to-weight ratio and corrosion-resistance of Republic Alloy Chain have encouraged the use of smaller and lighter chain slings to carry heavier loads safely. Also resulting in greater efficiency, longer service life and ultimate economy. (3)—Craftsmen at Republic's Bolt and Chain Division form the alloy steel into chain, then into chain slings engineered for the highest degree of safety. Each sling is proof tested and warranted to meet or exceed specifications.

Republic Alloy Chain is made from special analysis open hearth steel, quality controlled from ore to finished product. It is heat treated to develop the highest possible tensile strength and maximum resistance to wear, shock, strain and work hardening. Stress relieving or reheat treating is unnecessary.

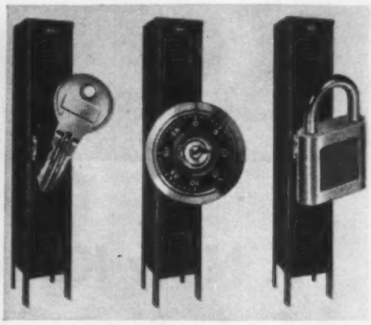
Your Republic Chain Distributor has complete information on alloy slings, high test steel and wrought iron slings, as well as fittings, and accessories.

This New Republic Catalog contains complete information and the latest, up to date specifications on Welded Chain, Accessories and Assemblies. It's a colorful, 62-page book loaded with everything you need to know about welded chain. Order your copy from your Republic Chain Distributor. Or write us direct. Ask for Catalog 701.



SAFETY DIRECTORS APPROVE OF REPUBLIC STEEL PALLETS. There are no sharp edges or projections to injure workmen or damage containers. Republic Pallets are fabricated from steel to eliminate maintenance expense—designed to eliminate broken deck members and stringers, protruding fasteners and joint failures. Republic Steel Pallets are available in many styles including the P-16-S Semidouble Face shown above. Write for Pallet Booklet No. 616.

SAFETY IS A BUILT-IN FEATURE OF REPUBLIC WEDGE-LOCK STEEL SHELVING. It is specifically designed for high stacking of enormous weights. Joints actually get tighter as weight increases. And there's no sagging, swaying or buckling. Wedge-Lock Steel Shelving provides maximum loading in minimum floor space. It is completely flexible to meet your changing space requirements and can be assembled quickly and easily.



SAFETY OF EMPLOYEES' PERSONAL PROPERTY is provided by Republic Steel Lockers with a choice of three locking systems—combination—padlock—key operated. These modern steel lockers, available in many types and styles, conserve space and offer clean, safe storage for employees' clothing and valuables. Republic's Berger Division offers a complete locker planning, engineering and installation service. Send coupon for more information.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-1697
3120 East 45th Street • Cleveland 27, Ohio

Please send more information on:

☐ Chain Slings
☐ Wedge-Lock Steel Shelving
☐ Steel Pallets
☐ Lockers
☐ Send Welded Chain Catalog 701.

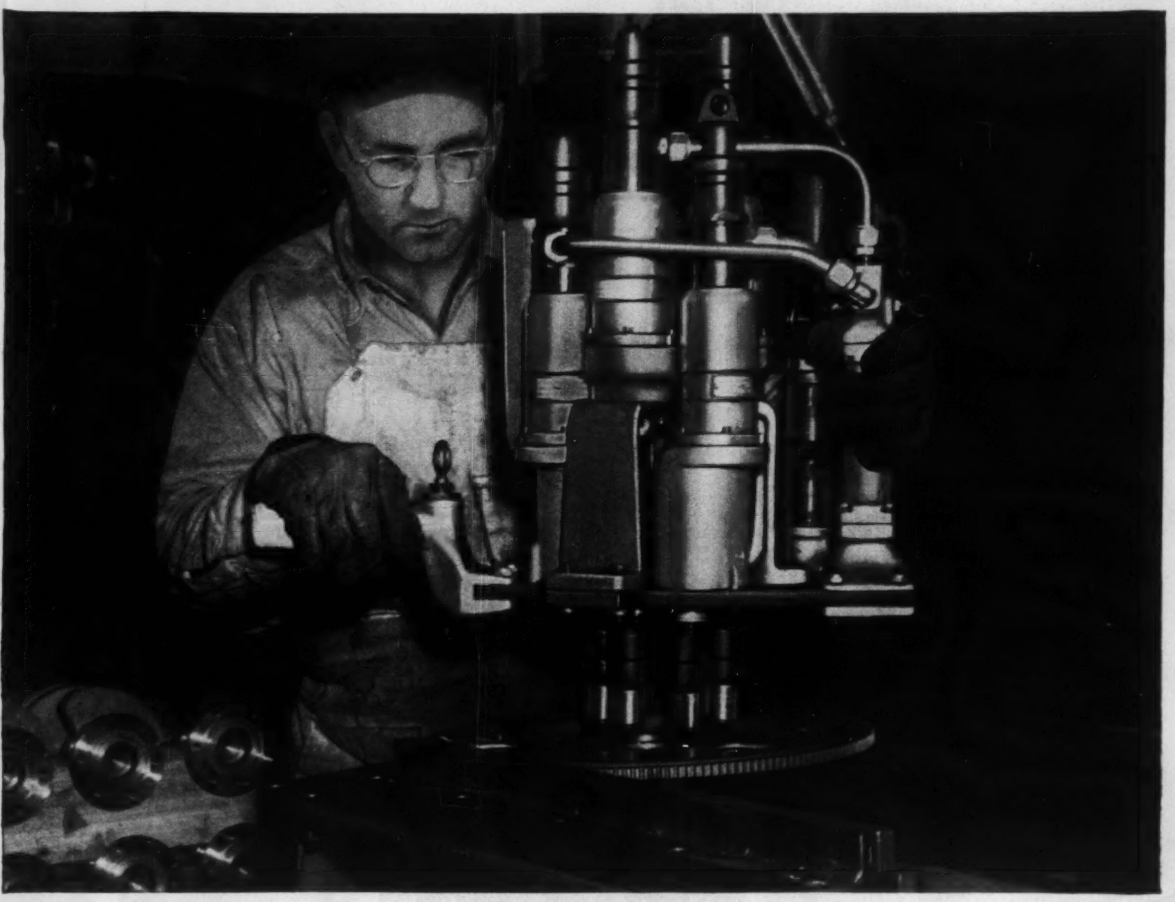
Name________________Title__________

Company________________________

Address________________________

City__________Zone_____State________

Gardner-Denver . . . Serving the World's Basic Industries



6-spindle Multiple Nut Setter assembles auto flywheel to crankshaft.

A New Keller Tool Fastening Technique Sets New Highs in Assembly Efficiency

Results: reduced costs — control of quality

If you have to set two or more nuts or bolts at a time, you've got a job for Keller Tool Multiple Spindle Nut Setters.

In one simple unit, from 2 to 20 spindles do the work in a fraction of the time required with a single spindle tool.

Designed for extreme flexibility: Standard air motors of any size can be combined in the same tool. Tight bolt clusters . . . different torque requirements . . . bolts at different elevations are adaptations. Handles and suspension can be positioned where desired. Let Keller suggest a setup for you.

Features you can use—profitably!

1. Adjustable torque control on individual spindles. Fourteen sizes cover torque range from 4 to 190 ft.-lb.
2. Torque held to close tolerances—equal to that of accurate hand tools.
3. Easily adapted to changing needs—a new mounting plate does the trick.

GARDNER - DENVER

KELLER TOOL division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

FOR BASIC

Open Hearth and Electric Steel Furnaces

HARBISON-WALKER

MAGNESIA RAMMING MIXTURES

H-W
H-W
C-MIX
H-W C-MIX
HARBISON-WALKER
REFRACTORIES CO.
PITTSBURGH, PA., U.S.A.
TRADE MARK
REG. U.S. PAT. OFF.
100 LBS. NET WEIGHT
H-W
C-MIX

H-W C MIX

Made From High Purity Seawater Periclase (92% Magnesia)

- **STABLE**—Excellent Volume Stability (shrinkage less than 1% when heated to 2910 F—ASTM C-113-46).
- **STRONG**—High strength over entire range of steel furnace temperatures accounts for its unusual resistance to erosion.
- **DENSE**—High density—low permeability.
- **EASY TO USE**—Cold rammed to finished contour of any hearth.
- **ECONOMICAL**—Provides durable monolithic hearths with low installation cost and increases furnace availability.

H-W
H-W
MAGNAMIX
H-W MAGNAMIX
HARBISON-WALKER
REFRACTORIES CO.
PITTSBURGH, PA., U.S.A.
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100 LBS. NET WEIGHT
H-W
MAGNAMIX

H-W MAGNAMIX

Made From Dead-Burned Washington Magnesite—Specially Sized—(80% Magnesia)

- **VERSATILE**—Dependable for new bottoms and especially adapted for both hot and cold maintenance jobs.
- **HIGH MgO**—Used without slag or scale additions, thus avoiding dilution of its high magnesia content.
- **DURABLE**—Excellent resistance to erosion accounts for its wide adoption as standard for repiping tap holes.
- **EASY TO USE**—Superior properties for patching large holes in banks and bottoms. Applied by air-ramming, gun placement or by hand in hot patching.
- **STRONG**—Strong cold-setting with crushing strength of 1500 P.S.I.

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
World's Largest Producer of Refractories
GENERAL OFFICES: PITTSBURGH 22, PENNA.

MICROHONING*

Generates . . .

ACCURATE, ROUND, STRAIGHT SURFACES

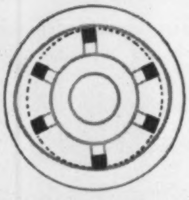
Truly round, straight surfaces are generated by the application of fundamental principles on which the Microhoning process and equipment design are based:

The combined reciprocating and rotating motion of the tool act on the full length of the bore on every stroke.

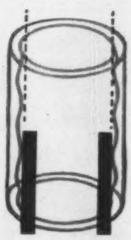
The self-dressing abrasive assures sharp grits and cutting at all times.

The tool and bore automatically align themselves.

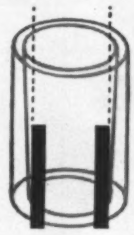
The feed-out of the tool is positive with equal pressure in all directions from the center line.



All out-of-roundness is removed by the expanding abrasive "cylinder" formed by the rotating tool. Only the tight areas are abraded until all areas have the same radius from the axis.



Wavy or snaky surfaces are made straight by the long abrasive sticks shearing off the crests of the waves.



In tapered bores the abrasives cut only in the tight area until the cylinder has the same diameter throughout its full length.

MICROMATIC

ACTUATING LEVER

Steel Forging ● 58 to 60 Rockwell "C"

Bore out-of-round and tapered .0015 to .0025 inch.

Microhoning reduces error to less than .00015 inch

Removing approx. .005 inch stock

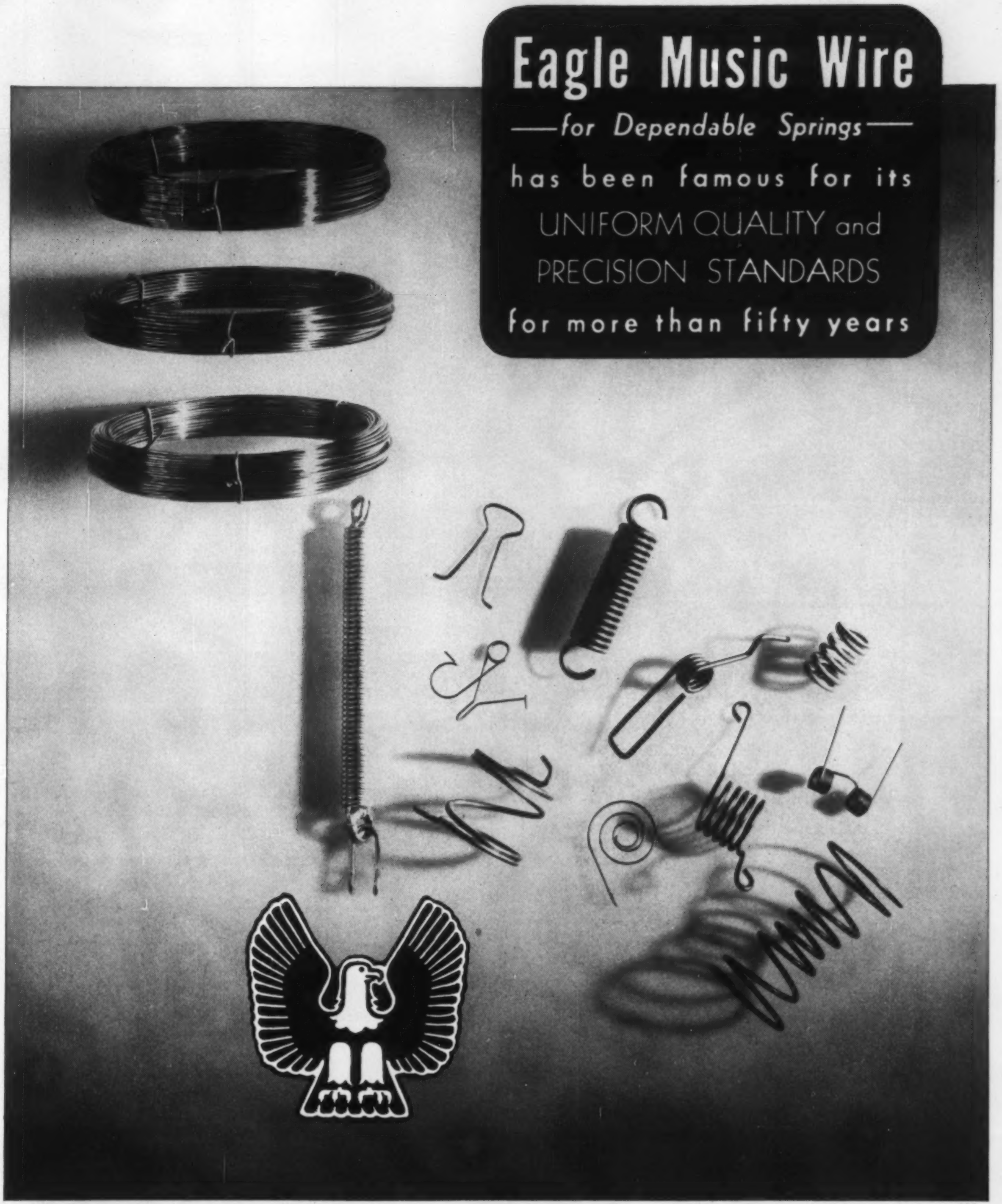
Production—130 pieces per hour

Machine—Model 705-2 Hydrohoner

***MICROHONING = Stock Removal + Geometry + Size Control + Surface Finish**

MICROMATIC HONE CORPORATION

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN


Eagle Music Wire
—for Dependable Springs—
has been famous for its
UNIFORM QUALITY and
PRECISION STANDARDS
for more than fifty years

106

WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY
CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

WIN a 2-weeks LUXURY

All Expenses Paid,

PARIS
THE CARIBBEAN

ENTER JONES & LAMSON'S

NEW HORIZONS

Grand Prize:

Two-Weeks Luxury Vacation Trip for Two, All Expenses Paid, to a choice of one of the following: Paris, Hawaii, The Caribbean, The Canadian Rockies, Plus $400 for spending money, baby sitter fee, etc.

Two 2nd Prizes: Each a Seven-Day All-Expenses-Paid Luxury Vacation for Two to Bermuda. Plus $200 spending money.

Three 3rd Prizes: Each a Shopmaster Combination Saw-Jointer Power Tool, complete with motor.

Ten 4th Prizes: Each a Shopmaster Individual Single-Purpose Power Tool (A Choice of Saw, Drill Press, Jointer, etc.)

Jones & Lamson, famed for opening up NEW HORIZONS in metalworking efficiency, now offers you, personally, NEW HORIZONS — a luxury vacation for two people for two weeks with all expenses paid, to your choice of Paris, Hawaii, The Caribbean or The Canadian Rockies.

Think of it — you can enjoy deluxe travel, finest hotels and accommodations, the very best of everything, plus $400 spending money. Live like a millionaire for two weeks, for just answering this question, "Which Jones & Lamson machine, or machine feature, could, or does, help you most, and Why?"

When you write in (use coupon or not, as you wish), we will send you an official entry form, together with information upon which to base your answer. So don't delay! Even if you've never entered any contest before . . . if you have a good idea and can express it clearly — *YOU* may win this glorious luxury vacation for two! And don't forget — there are other prizes! — two deluxe 7-day all-expenses-paid vacations for two to Bermuda, and 13 prizes of famous Shopmaster home workshop Power Tools! Enter *today!* Read the simple rules, and send in this coupon *NOW!*

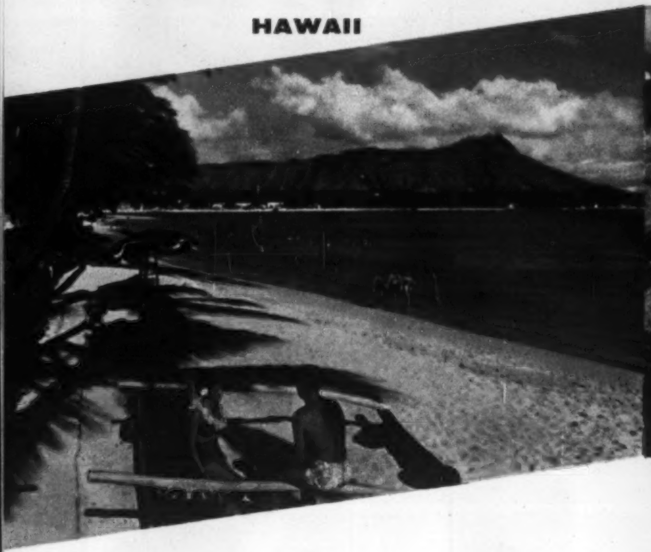
JONES & LAMSON MACHINE COMPANY

517 CLINTON STREET, SPRINGFIELD, VERMONT

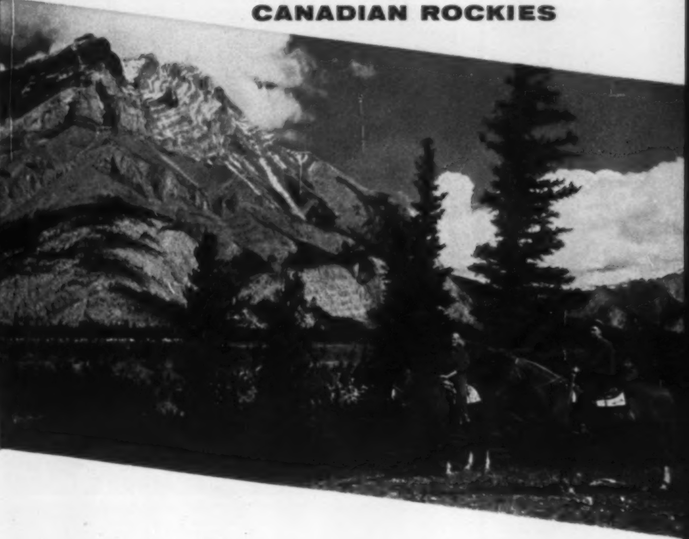
VACATION FOR TWO!

to your choice of . . .

HAWAII



CANADIAN ROCKIES



CONTEST TODAY!

CONTEST RULES

Contest is open to all persons, residing in the continental U. S. A., engaged in metalworking or allied industries, except employees of Jones & Lamson Machine Company, its selling agents and its advertising agency, and members of their families.

Contestants merely answer, in 150 words or less, the question "Which Jones & Lamson Machine, or Machine Feature, could, or does, help you most, and Why?"

Entries are to be mailed to Jones & Lamson NEW HORIZONS CONTEST, Box 364, Back Bay Annex, Boston 17, Massachusetts.

Entry must be contestant's own, and must be hand-printed or typed on an official Jones & Lamson NEW HORIZONS CONTEST entry form. Entry forms that are not completely filled out will be disqualified. Entry forms filled out in handwriting will also be disqualified. No entries will be returned, and all entries become the property of Jones & Lamson Machine Company.

The submitting of a contest entry implies the contestant's agreement with and submission to all contest rules. Contest entries must be postmarked by midnight July 10, 1956 and received by July 20, 1956.

Board of Judges will include machine tool engineers, production foremen, business executives, trade publication editors, and an engineering college faculty member.

Judges' decisions are final. Entries will be judged for aptness of thought, originality and sincerity. "Literary style", as such, will *not* be a deciding factor. Elaborate or "fancy" entries will receive no extra consideration.

Winners will be announced in Jones & Lamson Machine Company advertisements in trade publications as soon as possible after the judging of the contest.

Easy to Enter! You Could Win!

JONES & LAMSON MACHINE COMPANY
517 Clinton Street, Springfield, Vermont

Please send official NEW HORIZONS CONTEST entry form and information to:

*Name*____________________________________

*Address*__________________________________

*City*____________________*Zone*____*State*________

Ramjet tailpipes withstand severe abuse. *(Photo courtesy Marquardt Aircraft Company)*

MULTIMET Alloy Controls the Blast of Ramjet Engines

Tailpipes used to direct the searing blast of power in today's ramjet engines must withstand temperatures in excess of 2000 deg. F, plus severe vibration. High-speed ramjets operate in the neighborhood of 1500 mph. At these high speeds, vibration is almost as serious a threat to tailpipe life as heat. Because of its strength at high temperatures, MULTIMET alloy has given good service in tailpipes that vibrate as much as three inches.

Ramjet tailpipes are made of MULTIMET alloy sheet that is only 0.051 to 0.078 in. thick. The combined high-temperature strength and oxidation resistance of MULTIMET alloy permits the use of lightweight tailpipes with good heat-transfer properties.

MULTIMET alloy is one of many HAYNES alloys capable of extending the life of parts used at high temperatures. For literature describing the properties of HAYNES high-temperature alloys, get in touch with the nearest Haynes Stellite Company Office.

HAYNES
TRADE-MARK
ALLOYS

HAYNES STELLITE COMPANY
A Division of Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
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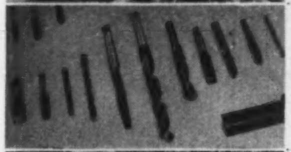
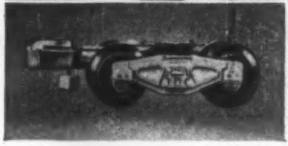
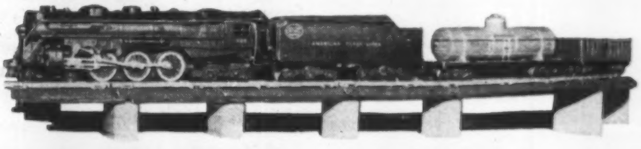
Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

"Haynes" and "Multimet" are registered trade-marks of Union Carbide and Carbon Corporation.

Can a Steam Atmosphere Furnace Save You Money?

There's a good chance it can if you heat treat any of a wide variety of ferrous parts. Here's a check list to show you why.

	PRODUCT	MATERIAL	ADVANTAGE
	Cams, bearings, valve tappets, pistons, piston rings, etc.	Cast iron	Wear resistance improves
	Twist drills, taps, punches, reamers, counter bores, etc.	High-speed tool steel	Tool life increased
	Saw blades, machine parts	Steel	Improved bonding surface for paint or lacquer prevents chipping and cracking
	Business machine, sewing machine, gun parts, bolts	Steel	Clean, safe, cheap method of blueing
	Bearings, bushings, pistons, toy parts, etc.	Powdered iron	Hardness and compressive strength improved

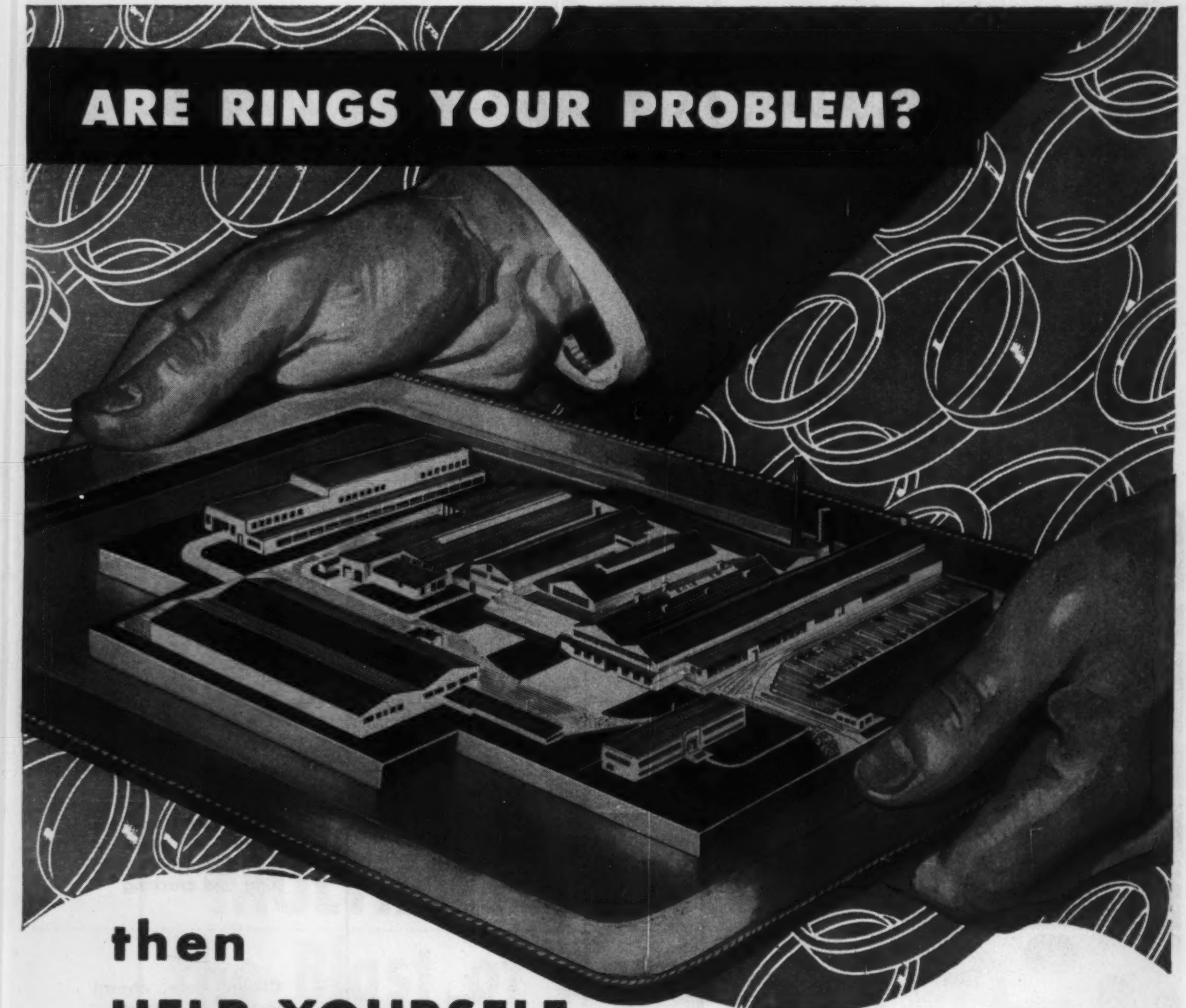


A. C. Gilbert Co. inexpensively achieve that uniform, wear resistant, blue-black finish on the undercarriages of scale-model trains by heat treating in an L&N Steam Homo furnace.

Complete equipment for steam atmosphere heat treating consists of a Steam Homo® furnace and L&N temperature control panel. Both furnace and instrument panel are shipped completely assembled ready for installation in your production line. Furnaces are available in a variety of sizes to suit your particular application. For complete information just write us at 4957 Stenton Ave., Phila. 44, Pa., and ask for Catalog TD2-620.

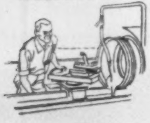
LEEDS NORTHRUP
instruments *automatic controls • furnaces*

ARE RINGS YOUR PROBLEM?

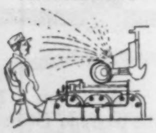


then
HELP YOURSELF

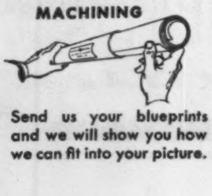
WELDING



FABRICATING



MACHINING



Send us your blueprints and we will show you how we can fit into your picture.

to a quarter of a million square feet equipped to solve your problem

American Welding has a quarter of a million square feet of floor space that houses the equipment necessary to manufacture production runs of welded rings (made from rectangular bars or special mill shapes) or circular weldments — from 6″ to 96″ in diameter, of ferrous or non-ferrous metal.

And that's not all — 900 specialists in ring manufacture are backed with the best in engineering and research — with heat treating, x-ray and test equipment required to meet aircraft specifications.

Let Amweld become your production welded ring department.

THE AMERICAN WELDING & MANUFACTURING CO.
110 DIETZ ROAD • WARREN, OHIO

AMERICAN WELDING

STEEL

April 9, 1956

Metalworking Outlook

Playing It Safe

At least one major steel producer has asked all supervisors from turn foremen up to complete their vacations before June 1. Don't interpret this as any steel company pessimism regarding the possibilities of a steel strike. The action is a preparedness measure. Blast furnaces, open hearths and coke ovens take time to bank or shut down and then must be cooled slowly or kept at a reduced heat to prevent damage. These and other necessary maintenance tasks are normally done by supervisors during shutdown periods.

On Their Marks

To get a head start on what looks like a busy season, three Great Lakes ore boats pulled up to the Soo Locks the middle of last week, the first vessels to do so this year. They were about eight days ahead of opening day last year. Depleted ore stocks in the lower lakes areas, plus predicted heavy mill demands, have haulers anticipating a capacity season.

Action on Weldments

Producers of weldments have initiated action to make sure they are able to get raw materials in an emergency. Being worked out by the Business & Defense Services Administration is a system that would put weldments in a priority bracket roughly equal to castings and forgings when it comes time to line up for metal. Complicating the setup are lack of a historical pattern of plate consumption for weldments, growing demand for weldments by new customers and changes in the type of plate being offered by steel producers.

Threat from High Metal Prices

The current rate of increase in the price of all metals poses a serious threat to the continuance of the business boom, says Col. Willard F. Rockwell, chairman of Rockwell Mfg. Co. He told stockholders that the company's metal costs have increased 6 to 34 per cent in the past year.

Small Business Improves

Small business firms had their troubles last year but still managed to finish well ahead of 1954, reports the Small Business Administration. The balm of healthy balance sheets helped take some of the sting out of higher prices, competition with larger rivals for skilled workers and the raw materials squeeze, especially in steel, steel scrap, aluminum, copper, nickel and lead. Despite improvements, look for congressmen to make political medicine out of some of the problems.

Prefab Homes: Still Growing

In 10 or 15 years, half the homes built in America will be prefabricated. That's the prediction of some experts cited by George E. Price, vice president of National Homes Corp., when he took over as president of Pre-fabricated Home Manufacturers' Institute. Prefab production jumped 20 per cent in 1955 over 1954, compared with a 9-per-cent gain in single-family, nonfarm housing starts. Last year, Americans purchased prefab homes costing, with land, $1250 million.

Gas Catching Up

Gas heat will be installed in 1 million more new and established homes this year, says Edward R. Martin of the Gas Appliance Manufacturers Association. At the end of 1956, 9 million homes will be heated with gas, compared with slightly under 9 million heated with oil, he believes. If those predictions come true, gas will surpass oil for the first time as the major fuel used in central heating.

Atoms Go to Sea

A U.S. nuclear-powered merchant ship could be operating by mid-1959, say four of the nation's corporate atom tamers. Ingalls Shipbuilding Corp., Foster Wheeler Corp., General Electric Co. and Babcock & Wilcox Co. have submitted proposals for selection, design, manufacture, delivery and supervision of installation of such a power plant in response to a Maritime Administration invitation. Nine other firms propose conducting preliminary studies of a nuclear propulsion system which may offer greater ultimate technical and economic advantages than the unit designed for installation in 1959. The administration is studying the proposals. Any final decision, though, rests on congressional authorization and appropriation.

More Soviet Engineers

Russia has about 890,000 engineers and scientists, compared with 760,000 in the U.S., states the Library of Congress in a report to Congress' Joint Committee on Atomic Energy. A "crash program" to increase the U.S. supply has been called for by some committee members, but concrete proposals are lacking. Allen Dulles, director of the Central Intelligence Agency, warns that in this present decade the Soviet Union will graduate 1.2 million university students in the basic physical sciences, while we will graduate only 900,000.

Straws in the Wind

The coal industry is seeking up to $3 billion to double its capacity by 1975 . . . General Services Administration will auction off the U.S.-owned foundry at New Castle, Pa., on Apr. 20; United Engineering & Foundry Co. was the sole bidder last August, but the Congressional Committees on Government Operations objected on points of law and value, and new bidding was ordered . . . Stromberg-Carlson Division of General Dynamics Corp. has suspended all television receiver production indefinitely, pending a review and decision on whether to continue in the market . . . Philco Corp. has begun using new mechanized equipment to cut TV set production costs so it can stay in Philadelphia in the face of "keenest competition in our entire history in television" . . . Lincoln Electric Co., a motor maker from 1895 to 1941, will re-enter the field.

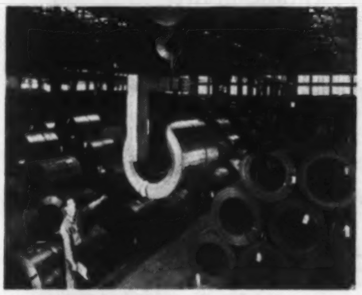
STEEL BUYERS GUIDE
to Ryerson Products and Services

You can draw on your nearby Ryerson plant for an almost endless number of products and services—and the more you concentrate your purchases at one source, the more you save. Ryerson products not pictured here include: Re-bars, expanded metal, grating, plastic pipe, machinery and tools, etc. See your Ryerson catalog for complete list and write for descriptive literature.

BARS—The most complete range of types, shapes and sizes as well as the largest tonnage.

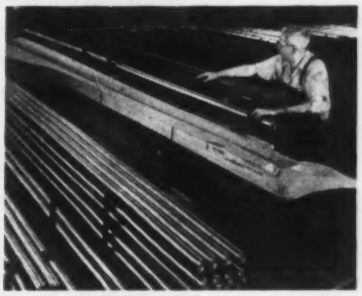
STRUCTURALS — I-beams, H-beams, channels, angles, tees and zees—all to ASTM spec. A-7.

PLATES—14 types including special low carbon plates for forming and welding, leaded New E-Z-Cut, etc.



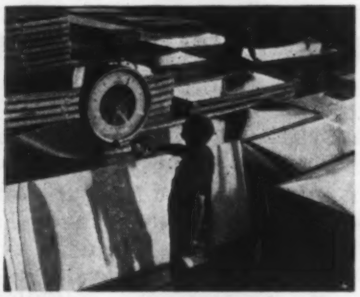
SHEETS & STRIP—More than 20 different types in pattern sizes, cut-to-order sizes, strip coils, etc.

TUBING—Seamless and welded mechanical tubing, fluid power tubing, structural and boiler tubes, etc.

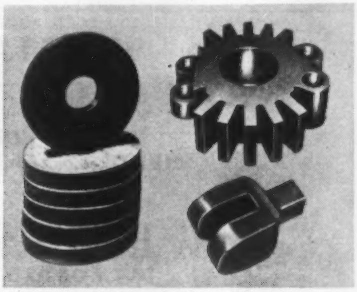


C. F. BARS—Cold finished steel for every use: screw steel, Ledloy, accuracy stock, machinery steel, shafting, etc.

ALLOYS—Every type including leaded alloys for fastest machining, all performance-proved by tests.



STAINLESS—Allegheny stainless in over 2,221 sizes, shapes, types, finishes: sheets, plates, bars, pipe, etc.



FLAME CUTTING—Almost any shape quickly cut from strong rolled steel—one or hundreds all alike.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The PROOF of the STEEL is in its PERFORMANCE

for example—The Case of DSC STRIP

THE FACTS

THE TIME: The 12-month period ended December 31, 1955.

THE PRODUCT: DSC Cold Rolled Carbon Steel Strip and Flat Cold Rolled Carbon Spring Steel.

THE SOURCES: DSC's Detroit and Eastern mills.

THE QUANTITY: Millions of pounds.

THE SPECIFICATIONS: Just about everything "in the book" including specially restricted thickness tolerance, special temper, special finish, etc.

THE APPLICATIONS: Just about every variety of stamped and roll-formed products from the simplest to some of the toughest.

THE RECORD

Out of every 100,000 pounds shipped 99,354 pounds met customers' requirements; rejections for all reasons—gauge, size, temper, finish, etc.—averaged 646 pounds.

JOB PERFORMANCE SCORE . . . 99.354%

Care for further evidence of DSC *Stripmanship*—33 years of it? Care to put one of your own strip jobs up to us? Care for copies of new DSC Extra books on Cold Rolled Steel Strip and/or Cold Rolled Spring Steel?

Whether it's Strip, Sheet, Rod or Wire—DSC *Steelmanship* is the same. Ask your nearby DSC Customer Representative.

Customer Satisfaction Is Our No. 1 Job

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

DISTRICT SALES OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Columbus, O., Dayton, O., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, St. Louis, Toledo, Worcester, Mass.

DSC MILL PRODUCTS

Hot Rolled and Cold Rolled Sheets • Hot Rolled Strip
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April 9, 1956

Case for the Craftsman

A skilled worker shortage is holding down production in one out of four metalworking plants. While the automotive industry was furloughing thousands of production people and cutting back assembly schedules during the first quarter, it was pleading for craftsmen in classified sections.

As a bottleneck to expanding production, the skilled worker shortage rivals the scarcity of engineers.

Accompanying the shortage is a high unrest among artisans. Job hopping is at a rate unprecedented in peacetime. Many craftsmen have become chronic grumblers. In some areas, they are attempting to form their own unions.

Reasons for the shortage are fairly clear. The low birth rates of the thirties are a contributing cause. The dislocations of World War II, including federal draft policies and quickie job training, are partly to blame. Industry's failure to reinstitute apprenticeship programs on a large scale is a factor. Even the GI Bill figures into the situation: Many young men who would have been artisans were able to attend college and attain white-collar status.

Causes for unrest are a little more obscure. The chief factor is a belief by skilled workers that the wage differential between the highly skilled and the less skilled has narrowed. It stems from the fact that the spread did narrow from the mid-thirties until the end of World War II. In its early years, the CIO insisted on flat increases. The New Deal, making a play for the common man, kept upping the ante on the minimum wage. As a result, the spread between skilled and unskilled narrowed. But a correction, sparked by the steel industry's job classification system, started at the end of the war. Today, the differentials for skill have returned to the historical pattern. Many craftsmen do not realize that.

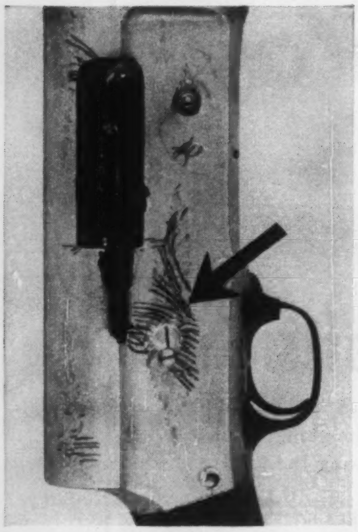
Another apparent cause for unrest among trained men is a lack of differential in prestige. They miss the feeling of importance they once enjoyed when they were the right-hand men to the boss. Bigness and unionization are to blame for this.

The shortage will continue into the 1960s. It can be alleviated only to a degree. We can't do anything about the birth rate of the thirties. Possibly we can't do too much about federal draft policies. Training, however, is a direct responsibility of industry.

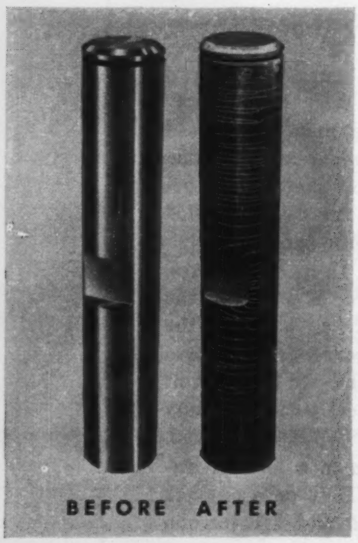
About unrest, management can do a great deal. First, it can and should inform its skilled workers on the economic facts of wage rates. Second, it can maintain a differential in fringe benefits. Third, if it grants any supplementary unemployment concessions, it can make sure the skilled worker benefits, that he is not asked to subsidize the marginal worker. And fourth, management can make the skilled worker feel more important.

Walter J. Campbell

EDITOR



Stresscoat is a Magnaflux developed brittle lacquer coating for testing and measuring stresses in working parts and designs. Stress analysis is providing new ways to reduce the cost and weight of products to make them stronger, better and cheaper.



Inspection with fluorescent Magnaglo under black light reveals cracks as glowing danger signals impossible to overlook. Magnaglo increases the speed of inspection and makes it easy to spot and identify defects in keyways, threads and other hard to see places.

Case Studies: TESTING METHODS

"GOOD TURN" INSURANCE pays off for the Todd Shipyards Corp., Brooklyn, N. Y. A portable Magnaflux unit is used to inspect for cracks in keyed taper of an 18" propellor shaft of one of the giant ocean-going vessels.

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"Conveyorized" Magnaflux inspection is engineered for jet engine production line. Jet engine vanes are inspected at the rate of 5,000 or more a day. First step is magnetizing vanes. Conveyor moves vanes into inspection booth (above) where inspector watches for any accumulation of magnetic particles indicating longitudinal defects. After passing through a second ferro-magnetic bath and longitudinal magnetic field, vanes are inspected for transverse defects. Then they move automatically through a de-magnetizer.

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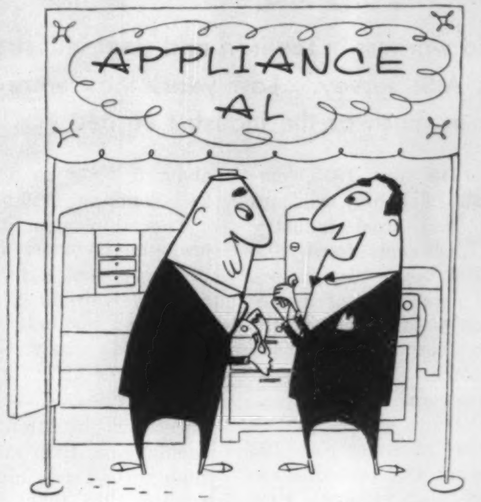


As a spur to new sales, makers and some retailers ask . . .

Used Appliance Market?

IN THE LAST three months Western Auto has put new emphasis on selling reconditioned appliances.

FIRESTONE finds that a used-appliance sales program has been well received by dealers in the last year.

WESTINGHOUSE is pushing used appliance sales.

FRIGIDAIRE is considering measures for establishing a market for used products similar to new-used auto marketing patterns.

Signs of Times—Those developments are signs that things are stirring in appliance distribution channels. Some experts believe that sales of new refrigerators could at least double if customers bought new ones every five years rather than buy every decade, the current rate.

Manufacturers, obviously, are interested in promoting the trend, and so are some retailers, especially those hard hit by the discount houses. Some chain and department stores believe used appliance merchandising may be the answer to discount competition.

Advantage—Many big retailers have the facilities to recondition and sell the used article. On liberal trade-ins (rarely given by discounters), these chain and department stores think they can meet discounters' prices. Then they can recover their profit through sale of the used article.

Not all retailers are happy about the idea. Listen to Sol Polk, president of Polk Bros., a Chicago supermarket for all major-brand appliances: "For the moment let's quit worrying about a used appliance business. I don't want them competing with my new appliances." A big national retailer even has an official policy against accepting trade-ins.

Coin's Other Side — But Firestone Tire & Rubber Co. operates some 40 used appliance sales and service centers where the units are reconditioned and put on display for the consumer. Early this year Western Auto Supply Co.'s 3000 stores began urging trade-ins. One reason: A competitive answer to discounters.

Westinghouse Electric Corp. is urging its retailers to accept trade-ins and is showing them how to market the used items. For example, dealers are encouraged to sell two reconditioned used appliances with one new one, in a promotion designed for young married couples just setting up housekeeping. It believes more than half of new appliance sales this year will involve trade-ins.

Ratios—Today, for every four new refrigerators sold, two are traded in; there are two washer trade-ins for every four new sales; one range trade-in for four new sales; one television trade-in for eight sold.

Used appliances now appeal to lower income groups, resort owners, landlords of furnished rooms and apartments. Many are exported to Latin America; a few go to public institutions.

Problems—Those for and against a new-used appliance marketing pattern say these factors must be considered:

1. Price—under today's installment buying, practically any consumer can afford a new appliance.
2. Lack of prestige factor—nobody worries about keeping up with the Joneses when they get a new refrigerator. The basic outer appearance of refrigerators changes little, so that age consciousness is not created.
3. Lack of real innovations—bigger and handier vegetable bins, rollout shelves, special egg racks and butter storage—all improvements in the last five years or so—haven't provided sufficient motivation to trade in the old one. "We need more new developments like the automatic defroster," says one retailer.

Answers—Advocates of used appliance merchandising argue that a customer can be sold via the low price. "Few people really like to go into debt," comments one dealer. "They usually would prefer to pay cash for a good used appliance, rather than buy a new one on time. Often a customer has a prejudice against used appliances which can be 'educated' out of him."

Modern home design is giving the appliance higher prestige value. "By taking the walls out of the kitchen and combining food preparation with eating and normal relaxation, there should be a trend to trading appliances faster," says J. J. Slattery, marketing manager for General Electric Co.'s household refrigeration department.

Manufacturers also plan more real technical innovations to boost obsolescence. Westinghouse will be distributing a complete line of built-in appliances by late summer. The combination dish washer and garbage disposal unit is coming soon. The combination washer-dryer was introduced last year. While the introduction of colored appliances is hardly a major technical innovation, "it is serving to boost sales, just as facelifting does for autos," says a Chicago manufacturer.

Like Autos?—It's doubtful that a used appliance market will ever blossom to the size of the used-car market. But the first signs of growth can't be denied. A new distribution pattern in appliances is emerging.

"In ten years, our sales could be doubled as a result of it," believes one producer.

Steel Pipe Speeds Fuel Supply

Housewives heat the morning coffee over gas that was 800 miles away just 24 hours before. The family car is serviced at a gasoline pump close to an underground "stream" of the fuel. Men working near Philadelphia refine crude oil flowing up from Texas.

These feats are made possible by a buried network of steel pipe carrying natural gas and oil across the country. The 380,000-mile network makes it one of the country's major transportation systems, says the American Iron & Steel Institute. During a recent year, oil and gas pipelines carried about 20 per cent of the ton-mile freight traffic in this country.

This network would not be possible without pipe provided by U. S. steel mills. During 1955, shipments of line pipe from the mills totaled nearly 3.1 million tons.

More than 17,000 miles are scheduled to be added to the country's oil and gas pipeline system in 1956, reports indicate. An average of 11,000 miles each year has been laid during the last ten years.

Steel Wage Costs Climb

Hourly paid workers in the iron and steel industry are better off, shows AISI survey. Last year, they were paid more than twice as much as the industry earned

BETWEEN 1940 and 1955, employment costs of hourly workers in the iron and steel industry climbed 201 per cent, from 90.5 cents to $2.72 an hour.

That's one conclusion of a new supplement on wage trends issued by American Iron & Steel Institute, New York. This total is broken down several ways:

Hourly—Average hourly payroll costs, says the institute, rose 193 per cent during the period. Payments for regular straight time are the biggest factor. They were up 169 per cent, to $2.25 an hour last year.

Among other factors making up average hourly costs: Shift differentials, overtime and holiday pay increased 14.6 cents. Vacation pay rose 9.3 cents.

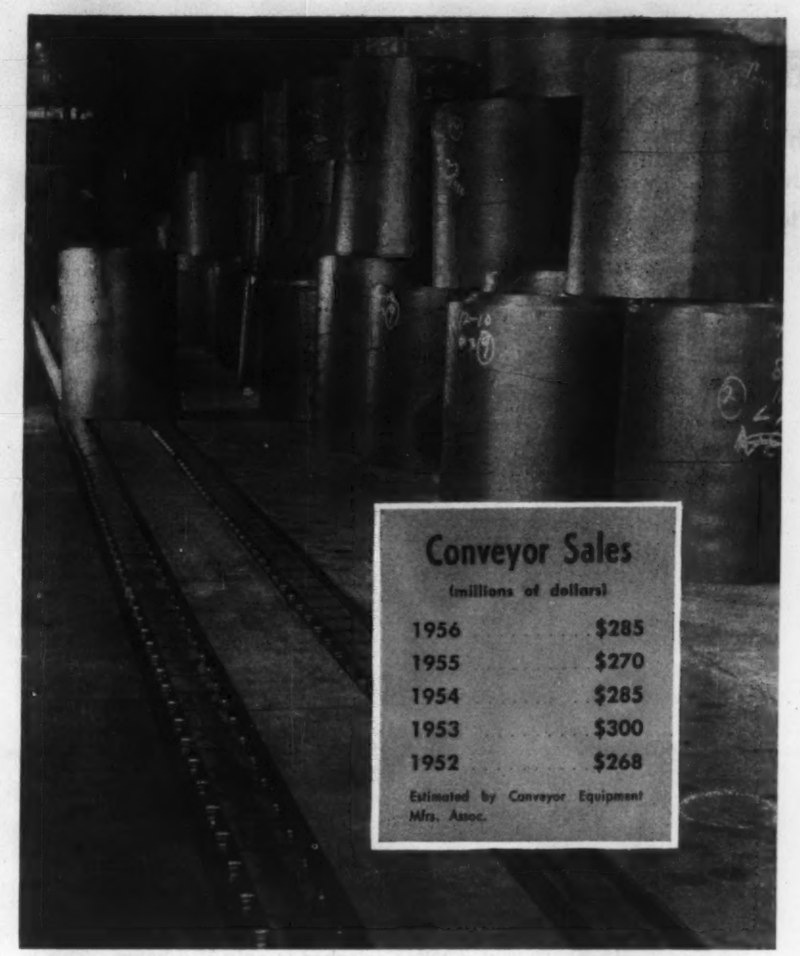
Fringes—Costs of pensions, insurance and social security more than quadrupled, progressing from about 5 cents an hour in 1940 to 21.3 cents in 1955.

The supplement shows that average hourly wages of steelworkers are more than eight times as large as they were in 1914, more than three and one-half times the 1929 level and nearly three times as high as the 1939 figure.

"Real" Wages — Making allowance for inflation, real hourly earnings in 1955 still were better than three times higher than they were in 1914, twice as high as they were in 1929 and 53 per cent above prewar levels. Between 1949 and 1955, they rose 28.6 per cent.

The wage-earner payroll in 1955 was more than $2.6 billion. It was shared by some 519,000 employees who worked an average of 39.2 hours a week. By contrast, the steel industry's earnings rang in at about $1.1 billion (STEEL, Apr. 2, Financial Analysis).

	Payroll Costs (Average—Per Hour)							
	Earnings—Per Hour				Other Payroll Costs			
	Straight Time							
Years	Regular	Shift differentials	Overtime, Holiday Pay and Premiums	Total	Vacation and Adjustments	Total Payroll Cost	Pensions Insurance & Social Security Per Hour	Total Employment Cost Per Hour
1955	$2.246	$.036	$.117	$2.399	$.110	$2.509	$.213	$2.722
1954	2.107	.034	.080	2.221	.112	2.333	.179	2.512
1953	2.023	.036	.110	2.169	.098	2.267	.173	2.440
1952	1.924	.029	.091	2.044	.104	2.148	.167	2.315
1951	1.769	.023	.080	1.872	.073	1.945	.169	2.114
1950	1.603	.023	.055	1.681	.065	1.746	.162	1.908
1949	1.574	.022	.037	1.633	.070	1.703	.050	1.753
1948	1.502	.022	.049	1.573	.056	1.629	.050	1.679
1947	1.393	.022	.041	1.456	.057	1.513	.050	1.563
1946	1.228	.022	.029	1.279	.075	1.354	.050	1.404
1945	1.073	.019	.108	1.200	.057	1.257	.050	1.307
1944	1.064	. . .	.103	1.167	.061	1.228	.050	1.278
1943	1.044	. . .	.077	1.121	.019	1.140	.050	1.190
1942	1.013	. . .	.031	1.044	.019	1.063	.050	1.113
1941	.928	. . .	.016	.944	.018	.962	.050	1.012
1940	.836	. . .	.007	.843	.012	.855	.050	.905
Increase 1955 vs. 1940	1.410	.036	.110	1.556	.098	1.654	.163	1.817
% Incr. 1955 vs. 1940	169%			185%	. . .	193%		201%



Jervis B. Webb Co. conveyor carries strip at Ford's Steel Mill Division

Conveyor Sales

(millions of dollars)

1956	$285
1955	$270
1954	$285
1953	$300
1952	$268

Estimated by Conveyor Equipment Mfrs. Assoc.

Conveyor Sales Speed Up

CONVEYOR sales are rolling right along. The outlook is for a $15-million industry-wide increase over last year (see table).

Manufacturers are definitely optimistic. At Barber-Greene Co., Aurora, Ill., sales are running 40 per cent higher than those of a year ago. The pace is expected to continue, though the percentage increase will dip as 1956 figures begin to tangle with the strong sales totals of 1955's last nine months; the first quarter of last year was on the slow side.

Gains—Jervis B. Webb Co., Detroit, looks for sales to be up 12 per cent over a record 1955.

"Conveyor sales in 1956 should be 25 per cent higher than in 1955, 7 to 10 per cent better than 1954, our best year," comments J. R. Hersey, assistant sales manager, C. O. Bartlett & Snow Co., Cleveland.

Strength—Behind the optimism: For one thing, backlogs are up to three times higher than a year ago, according to R. C. Sollenberger, executive vice president, Conveyor Equipment Manufacturers Association.

For another, there is a broad customer base, with almost all segments of industry getting on the conveyor. Among leading customers: Automotive, steel, electrical appliances, television manufacturers, the paper industry, sand and gravel quarries.

Controversy — Conveyor people are split on automation's impact on their business. Some say a bigger factor is industry's current plant and equipment spree (see STEEL, Mar. 26, p. 85).

Others agree with J. B. Sturgis, Logan Co., Louisville: "Of far greater importance (than automation) is the general labor shortage and higher wage scales which make it necessary to eliminate by use of conveyors as many operations requiring unskilled labor as possible.

"Naturally, the publicity given to automation has helped to make users more conveyor minded."

Snags—When automation is a factor in the sale, it brings up its own problems. States E. H. Woodberry, manager, Conveyor Division, Lamson Corp., Syracuse, N. Y.: "As automation increases the scope and application of conveyors, it presents many problems to the manufacturer. The complexities and needs of each job are increased, and we are required to get into electrical fields with complex control systems which are rather new to this business."

This puts the conveyor people right in the thick of the spirited competition for engineering talent, comments Mr. Woodberry.

Sidelights — Another aspect of the automation angle, says Mr. Hersey of Bartlett & Snow: "Conveyors often need loading or unloading devices to keep up with the automated machines. For foundry conveyors, the company now makes close-up machines to go with the conveyors. Automation has expanded the company's product line."

Technical developments in conveyors have been evolutionary, rather than revolutionary, say industry executives. Current progress is along the lines of more electronic controls and mechanical improvements, reports Mechanical Handling Systems Inc., Detroit.

But several manufacturers hint that big changes are coming. Some will be unveiled at the Material Handling Exposition in Cleveland, June 5-8.

Dilemma in Machine Tools

At least for the moment, Washington strategists are betting on a short war. Their philosophy has some far-reaching consequences—including machine tool progams

CONTINUING DEBATE between the long and short-war strategists clouds the Washington machine tool picture.

That's the belief of Graham E. Marx, executive vice president, G. A. Gray Co., Cincinnati. As chairman of the government relations committees, National Machine Tool Builders' Association, he told NMTBA members at their spring meeting in Houston: "Admittedly, problematical emergencies demand nebulous solutions." "But," he continued, "regardless of the type of any future war, machine tools will play a vital part in our over-all ultimate effort."

Dead or Dying—Apparently the "short wars" are ahead. The death of the Vance plan (Mr. Marx says that if it isn't dead; it has been seriously maimed) tells the story. It provided for the storage of future production capacity.

"In essence, ODM and the Defense department have instigated a do-it-yourself program in which each of the services is required to review, periodically, its facilities and budget in accordance with its routine procedures for replacement and modernization of productive facilities."

Shift—The edict sends budget money into facilities for current production; it de-emphasizes (or forgets) machines for storage.

Mr. Marx figures the Defense department should be spending about $146.4 million each year just to modernize and keep abreast of obsolescence.

Air Force—Dudley C. Sharp, assistant secretary of the Air Force, told builders the AF already is set to embark on its part of the new replacement program. As owner of about half the department's 280,000 machine tools, the AF has authorized some $70 million for this fiscal year.

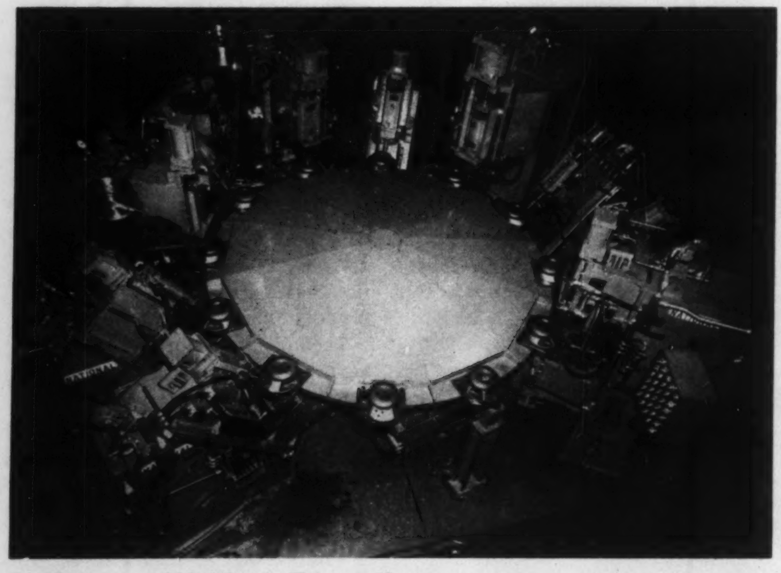
The Air Force program has three phases, Mr. Sharp said. They are: 1. Direct a maximum number of AF-owned tools to current production. 2. Set up a program to modernize these tools. 3. Finance and foster equipment developments which promise to increase production efficiency.

Of the tools the AF owns, 2 per cent are more than 15 years old, 38 per cent are between 10 and 15 years old, 3 per cent are between 5 and 10 years old and 57 per cent are less than 5 years old.

In the new program, tools bought before 1941 will be "disposed of" when they need repair. Tools bought from 1941 to 1946 and requiring 25 per cent, or more, of their acquisition value for repair also will be disposed of. So will tools bought after 1946 requiring 35 per cent of their acquisition value for repair. A repair ceiling of $3500 per unit has been set.

What's Coming—When it's shopping for new tools, the AF will take a close look at electronic programming and director-control applications. They've already paid off in some aircraft jobs.

Mr. Sharp cites the machining of a wing skin. It used to take 130 hours per piece. With electronic controls, the time has been slashed to only 12.2 hours. This is the type improvement the AF is reconnoitering.



Resistance Welders Team Up

Ten machines, rated at a total of 880 kva, are grouped in this installation by National Electric Welding Machines Co., Bay City, Mich. The welder completes one assembly every 10 seconds. It's used for assembling refrigerator parts

Paper Work Cut by Teletype

Nearly 80 per cent of the paper work usually involved in handling orders is being eliminated by Diamond Alkali Co., Cleveland. A specially designed Teletype links Diamond's nine branch offices and 13 plants with the home office. It was jointly developed by Diamond, American Telephone & Telegraph Co. and Ohio Bell Telephone Co.

The integrated data processing system will transmit and schedule orders and send invoices automatically. An annual savings of $30,000, plus more accurate means of inventory control, improved production planning and more efficient scheduling will result, reports B. W. Anderson, project analyst of Diamond's systems and procedure staff. Normal routings of orders are reduced from 60 to 18 hours.

American Zinc Institute

Improved zinc anodes provide better protection against corrosion for ships

Engineers Fight Corrosion

IT COSTS American industry some $6 billion a year for corrosion protection and the replacement of corroded equipment, estimates the National Association of Corrosion Engineers (NACE).

During its annual meeting and exhibit (Mar. 12-16), corrosion specialists reported on some of the areas affected: 1. Nearly 418,000 miles of railroads. 2. More than 1 million miles of water, gas and oil pipe lines. 3. About 211,000 miles of metal sheathed buried cable. 4. Countless tanks and foundations. 5. Every metal-clad marine vessel.

What To Do—Corrosion engineers talked in terms of brushing, spraying, wrapping, plating—using everything from new foam compounds to pressure sensitive tape to help fight corrosion.

One exhibitor featured a titanium valve. Its cost: $1600. A conventional valve costs $27. Several of these titanium units are being used experimentally in a company which is processing hot sulphuric acid. Corrosion men feel that the valve will last some 40 times longer than others tried and will prove to be a good investment.

Anodes Help—Cathodic protection is gaining in acceptance, NACE members reported. The effectiveness of zinc anodes (see photo), says one producer, is being improved by reducing the amount of iron in the anode to 0.0014-per cent. Magnesium anode makers point out that while 70 to 80 per cent of their sales have been for underground pipelines, storage tanks, etc., this year may see at least 30 per cent of sales going for marine applications. There also is a growing feeling that the Navy (after years of study) is about to endorse the use of cathodic protection.

Plastics can help prevent corrosion, too. Backers admit that there still is much to learn. They point out that plastic coatings, linings, cements, pipe, ductwork and structures can be used with growing confidence when engineers writing specifications are well schooled in the material limits.

Methods — Corrosion men are talking more about metallizing. They explain that it is useful in providing a protective coating for many products which can't be hot dipped due to inaccessible areas. Pliable foams, which can be sprayed or poured on storage tanks and piping, also are receiving added attention. Foam-type materials can eliminate clips, bands, cutting and fitting.

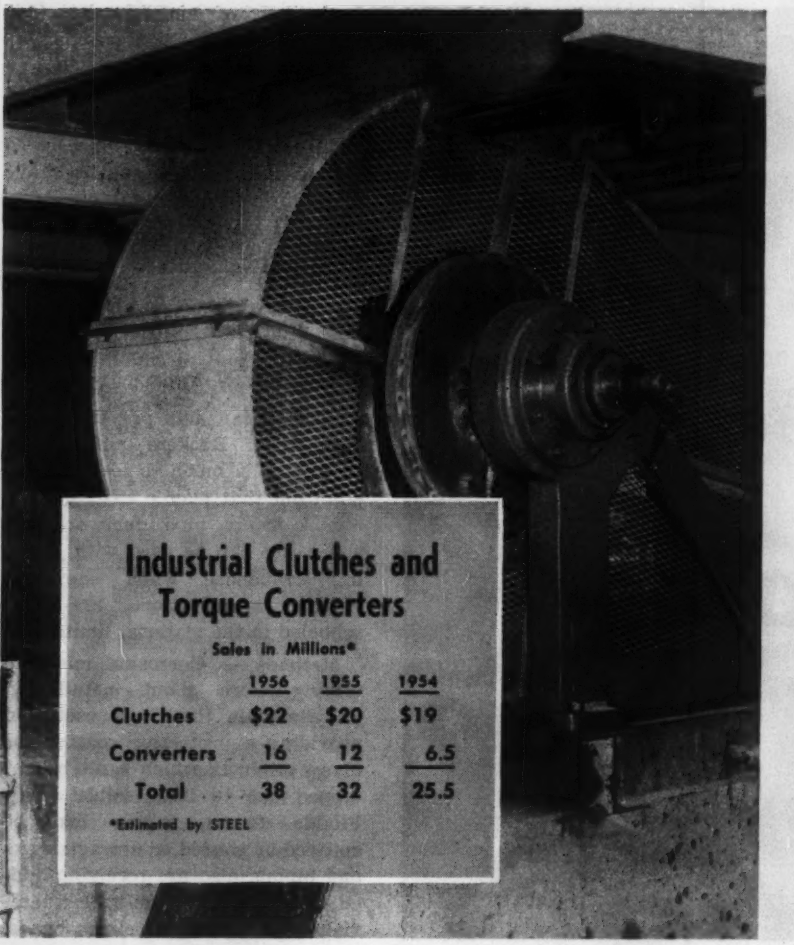
Goal: Corrosion engineers stressed one point many times during their meeting: Find the best protective material to meet your needs. If you do, your corrosion costs may dip 25 to 30 per cent.

Wirebound Boxes Set New Mark

An all-time record number of wirebound shipping containers were used during 1955 for shipping industrial products, ranging from fragile and delicate instruments to large and heavy machinery, says the Wirebound Box Manufacturers Association.

It was revealed at the association's annual meeting in Belleair, Fla., that industry used 5.2 per cent more wirebound containers than it did in the previous record year.

Unit sales totaled nearly 195 million boxes and crates, and the dollar volume for the industry was more than $112 million.



Industrial Clutches and Torque Converters

Sales in Millions*

	1956	1955	1954
Clutches	$22	$20	$19
Converters	16	12	6.5
Total	38	32	25.5

*Estimated by STEEL

Twin Disc air-operated clutch for drive on clay sewer pipe machine

Clutch Sales Climb

Clutch and torque converter makers will tuck an 18-per-cent sales increase under their belts this year. Longer-term, they hope that standardization will boost sales

INDUSTRIAL clutches and torque converters should hit the $38-million sales mark this year. That's a hefty jump from last year's $32 million.

Booming construction and general industrial expansion account for the sales increase, according to a survey of 20 leading manufacturers of both products.

Difference — Twin Disc Clutch Co., Racine, Wis., one of the largest manufacturers, points out that a torque converter does not replace a clutch. Clutches act as disconnectors between a machine and its power source. They usually are friction, oil-actuated, hydraulic or electric types. Torque converters supplement and sometimes replace transmissions in transmitting power to a machine.

Major customers for both products are the construction, petroleum and agricultural industries. Crawler tractors use more torque converters than any other type of equipment. Oil field drilling rigs use both converters and clutches. Rigs may have up to ten clutches.

Other applications are found in the aircraft, machine tool and steel industries. Paper mills, textile machinery, refrigeration, air conditioning and dry cleaning equipment take their share, too.

Automatics — Salsbury Corp., Los Angeles, indicates that automatic clutches and converters are getting a bigger play than ever before. This company points out that automatic clutches and torque converters allow load-free idling and provide higher starting torque without sacrificing top speeds. They also permit the use of smaller engines.

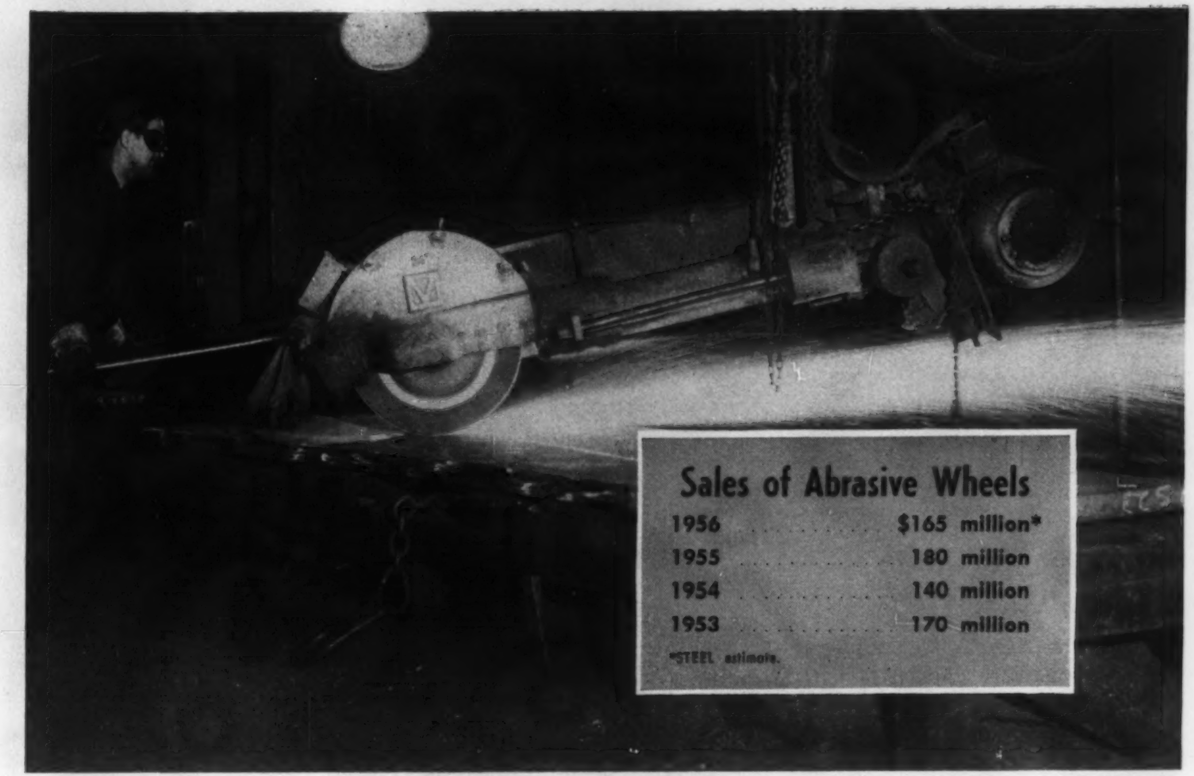
Special Problems—Since the uses of clutches and converters range from big power cranes and shovels to small electrically driven drums for sifting or shaking chemical ingredients, applications often require special engineering.

Twin Disc, for example, is just bringing on the market a 15-in., single-stage converter which is designed for power shovels. Automatic Steel Products Inc., Canton, O., reports that it is concentrating on clutches for gasoline engines of 5½ and 8½-hp. Allison Division of General Motors Corp., Indianapolis, has developed a torque converter which has four speed ranges, seven torque ratios and handles 100 to 350-hp.

Clutches for electric motors are becoming more common. This field has been neglected because it has been easier to turn electric motors off and on rather than provide a clutch. Now, in small automated assembly lines clutches are needed to provide automatic engaging of electric power units.

Sales Standards—The biggest trouble spot in this industry: High unit costs brought about by special engineering and specialized applications. Most manufacturers believe that developing standardized models will help boost sales.

Twin Disc adds that a converter almost always will provide increased production and simplify handling of any machine. This means that less skilled operators can use heavy construction equipment. As building and roadmaking business looms larger, this is a sales point worth considering.



Sales of Abrasive Wheels

1956	$165 million*
1955	180 million
1954	140 million
1953	170 million

*STEEL estimate.

Simonds Abrasive Co.

More applications and more flexible grinding prove . . .

Abrasive Research Pays

DEVELOPMENT of improved abrasives is resulting in the greater use of grinding operations in metalworking, as well as broadened applications for ceramics, glass, stone, masonry, concrete and carbides.

A moderate decline in sales of abrasive wheels this year (5 to 10 per cent under 1955's record $180 million) is not taking the edge off the abrasive industry's optimism.

Investigation—Carborundum Co., Niagara Falls, N. Y., and Norton Co., Worcester, Mass., cite the industry's liberalness with research funds. Fred L. Curtis, sales manager, new products, Norton, reports: "We are investigating the incorporation of many new products into our wheel line which can be produced from existing facilities."

D. S. Saurman, Simonds Abrasive Co., Philadelphia, thinks reinforced resinoid bonded products are outstanding among developments in his field.

Consumption — The automotive industry, while still one of the leading users of wheels, has not increased consumption as fast as others. The use of flexible wheels and gang wheel operations are increasing production.

The single bearing grinder for crankshafts has been replaced by six-wheel gang equipment to machine 50 units an hour. Output was 100 units a day.

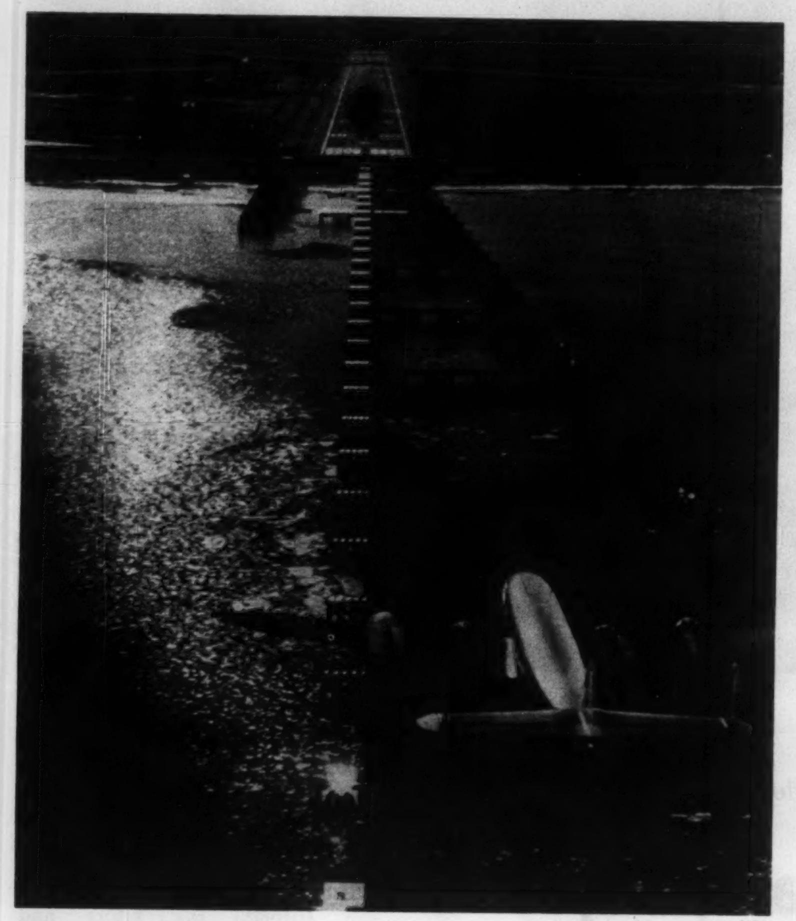
Machine Shipments — In 1955, shipments of grinding machines totaled $98 million, 15 per cent of all cutting machine shipments.

Less than six wheel manufacturers account for over 90 per cent of the business. Prices last year were up about 8 per cent, and producers are looking at their methods of distribution for possible customer-service improvements.

Sales Engineers—Most firms are developing trained engineer-sales organizations, while the trend to sell through distributors and specialized industrial houses continues. Better than 50 per cent of abrasive wheel sales are handled through distributors.

Elden L. Auker, sales manager, Bay State Abrasive Products Co., Westboro, Mass., says: "Distribution of grinding wheels is a technical sales problem, primarily an engineering job. We have training programs for distributor sales personnel, selecting those with sales experience and an inclination to specialize in abrasive wheels and allied products."

New Fields — Portable electric tools offer opportunities for exploitation. With new types of break-resistant grinding wheels, it now is practical to use portable electric tools for grinding and cutting applications not previously considered, reports W. H. Ferry, manager, industrial division, Skil Corp., Chicago.



NEA

More and faster air traffic means. . .

Airway Automation Needed

AUTOMATION will take to the skyways if Congress loosens the purse strings in response to the Civil Aeronautics Administration's plans for better control of air traffic.

At the heart of the program is a projected $1-billion investment in traffic control, navigation and communication facilities. They are aimed at improving safety on the nation's congested air routes.

Goal—Included in the plan are radars in sufficient quantity to allow air traffic controllers to "see" planes in flight continuously. The present system is to plot aircraft positions by hand on a board. Especially wanted is a long-range radar which can see 130 nautical miles and up to 40,000 ft to control traffic en route.

Electronic computers probably will be needed to handle safely the 50-per-cent growth in aircraft population predicted in the next 20 years. Complicating the problem: 150-mph planes and 600-mph jets competing for the same airspace.

Timetable—L. W. Burton, aviation specialist, Commerce department, estimates that if Congress approves the request for funds recommended in the President's budget message, the system can be in operation within three years, since 60 per cent of the radars needed will be part of the air defense system, which already is in operation.

The Commerce department and the military supposedly have drawn up working agreements to integrate the defense equipment into the traffic system.

Just the same, electronic firms should get a nice chunk of business—including orders for 69 long-range radars to be installed by 1961.

Eighteen would be provided for in the coming fiscal year, according to present proposals.

New DMS Symbol

"Further converters" (mostly nonintegrated fabricators) of controlled steel materials will be required to use the Defense Materials System identification symbol FC on defense-rated orders. This in addition to certifying to suppliers that the full quantity of such orders will be used on defense projects, or to replenish controlled material inventory used up to fill defense orders.

The Business & Defense Services Administration says the action is aimed at helping steel producers identify defense orders and to get critical production materials, like nickel, needed to fill such orders. It's also expected to plug a hole through which, it's thought, a few firms misused the system to obtain hard-to-get materials for their own use.

Orders for shipment after June 1 must carry the FC symbol and certification. Orders already accepted for delivery after June 1 must be validated not later than Apr. 16 by use of the FC symbol and certification to receive preferential treatment. The action does not affect orders placed for shipment before June 1.

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...OR WASHES DIAPERS
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It's hard to mention a type of product in which Sirvene parts are not doing an important job. When you need an oil-resistant, pliable synthetic rubber part with an exact degree of flexibility or hardness, resistance to extreme temperatures, fluids or gases, abrasion and wear . . . C/R Sirvene can serve you dependably. C/R engineers and compounders are prepared to assist you with design of a part . . . will formulate the correct Sirvene compound to meet your specific requirements . . . will test-prove it for final production. Quantity production is laboratory controlled, assuring you of constant quality and uniformity. Write us for your copy of the new "Sirvene" brochure.

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Export Sales: Geon International Corp. Great Neck, New York.

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C/R Shaft and End Face Seals • Sirvis-Conpor mechanical leather cups, packings, boots • C/R Non-metallic Gears

They're making a BIG HIT

in production shops . . .

POWERMATIC

The new Powermatics are medium-size production type millers with a powerful spindle drive . . . actually 200% more power than the previous design. 7½ hp cuts are just routine performance. And because of the many setup conveniences, you can get going fast! Change-over time from one job to the next is comparable to many knee-type millers. Just consider the cost-reducing possibilities of these Powermatic features:

Automatic two-way table cycles; reversible through a selector knob

Cycle selectors control the automatic functions; can be interchanged in a minute or two

Single lever table control; for starting automatic cycles . . . for manual control when setting up the job

Automatic backlash eliminator; adds down-milling and reciprocal milling to Powermatic versatility

Automatic spindle stop; at any point during the cycle, controlled by cycle selector

Three styles: Plain, Duplex, Plain Rise and Fall

Of course, there are many additional ways in which the new CINCINNATI Powermatics can help you produce more at a lower cost. You can't afford to overlook these fine new CINCINNATIS. Ask for catalog No. M-1913.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

Plain Rise And Fall
POWERMATIC

CINCINNATI

BRIEF SPECS.

seven sizes	Nos. 200-112 to 200-118
table working surface	11″ x 55⅝″ to 11″ x 126⅛″
range: table travel	24″ to 96″
spindle carrier	8″
quill (cross)	3″
table rapid traverse	300″ per min.
16 table feeds: std.	½″ to 20″ per min.
high series A	1″ to 40″ per min.
high series B	2″ to 80″ per min.
16 spindle speeds	30-1200 rpm 50-2000 rpm (std.) 75-3000 rpm

CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

AMF's Gott: Mergers His Specialty

"THERE ARE RICH REWARDS as well as innumerable headaches when you embark on a program of diversification through acquisition," says Rodney C. Gott, executive vice president, American Machine & Foundry Co.

He Should Know—Soldier turned businessman (he was graduated from the U. S. Military Academy in 1933), Rodney Gott has helped make the decisions on purchasing companies which have expanded AMF's sales and rentals from about $5 million in the early '40s to $145 million in 1955. Its product mix: Packaged atomic reactors to tricycles.

Ground Rules—Here, says Mr. Gott, are some of the things to look for when you are thinking about purchasing a company. It should: 1. Be a profitable business in a large and growing market. 2. Have management depth and be adequately financed for at least its present level of operation. 3. Show potential for growth and/or expansion into related lines through its association with the acquiring company.

Problems—Masterminding lines of authority is a constant challenge. "We like to think of ourselves as engineering and management consultants for our subsidiaries," explains Mr. Gott. AMF's policy: The parent company must handle financing, tax problems, patents, plant insurance and corporate-wide aspects of public relations.

Fringe benefits can create serious situations. Some of the firms AMF purchases will have no retirement plans, sick leave benefits, etc. "But," he relates, "we do not automatically turn over the parent company's fringe benefit plans to a newly merged firm. We feel it should be somewhat in the nature of a long-term reward."

Purchased Firms — Engineering staffs vary from zero to full-scale research and development groups. "Our philosophy is that the parent company should accept responsibility for research and development of products to be marketed in five or ten years, allowing the subsidiary company's engineers to work out product improvement, cost savings, etc., on its current line of products."

Educational background and military experience (he rose from second lieutenant to full colonel in command of division artillery, 79th Infantry Division, during World War II) have helped prepare Rodney Gott for his assignment as "chief of staff" for AMF's far-flung interests. Says Mr. Gott: "We try to instill everyone with this one thought: We are restless . . . we want to grow."

Eight Steps To Corralling Office Costs

1. **Find out what each employee thinks his job is:**

   Have each man list his work on a daily, weekly and monthly basis, giving his estimate of the time he spends on each job. Have supervisors check these data for completeness and accuracy

2. **Get detail on how employees spend their time:**

   Make chronological forms dividing the day into 15-or-30-minute intervals. Have employees fill in the time they spend on each job

3. **Check accuracy of these job and time data:**

   At random intervals, check through the department until a pattern of idle vs. active time is established for each employee

4. **Transfer individual job data to a work sheet:**

   Aim: To classify each employee's work and to show which secondary

Use Office Engineering:

By M. K. SHEPPARD

M. K. Sheppard & Co., Cleveland

CLIMBING costs of salaried labor are coming in for closer scrutiny by alert metalworking management.

Here's how one large manufacturer saved $40,000 a year in office expense and reduced the time it took to process quotations and sample drawings from three weeks to less than four days.

Problem—One group in the engineering department was causing long delays in processing orders for samples and making small engineering changes in repeat orders. The chief engineer thought additional people would solve the problem. The general manager decided on making an engineered analysis of duties.

Employees were asked to fill out a form showing duties performed daily, weekly and monthly, with the time spent on each duty. For one month, they were then asked to fill in a chart dividing each day's work into half-hour increments. From summaries of these data, functional organization charts were drawn of current and recommended duties. These basic reasons for the department's slowness were discovered:

Item: Each process sheet and shop drawing had to be checked with the design and specifications group of the sales engineering department in another city.

Item: Each member of the department under study was acting as a specialist, responsible for certain types of work only. With each step, work was checked through a group leader. The average job required a minimum of six checks.

Item: Work loads were unbalanced. Duplication of effort and improper flow of paper work came to light.

Recommendations—In line with the survey, the design and specifications group was transferred from the sales engineering to the main engineering department. Each man was given responsibility for overseeing a complete job. The new organization chart was put into effect.

Results: The same amount of work was handled satisfactorily by 30 per cent fewer people. Order processing time was reduced from three weeks to 48 hours. Employees became more flexible. Because their experience was broader, they became better candidates for promotion. Additionally, cash was saved when engineering cut back its floor space and reduced long distance phone bills.

Growth Pains—Similar analysis was made of a company whose production facilities and accounting had grown like Topsy. While production techniques had been modernized, accounting systems remained unchanged. Accounting had assumed responsibility for classifications he fits into. Duplication, excessive time spent on any one job and other inefficiencies will show up

5. **Find out the total time spent on each job:**

   This information gives a further check on duplication and shows whether work accomplished is in proportion with time spent

6. **List all jobs in the department:**

   If the study is of a multidepartmental nature, work of one department can be checked against that of another for duplication

7. **Re-allocate jobs to individual workers:**

   Base organization on skill and ability required. Duties are divided into fixed jobs, independent of work volume and varied jobs. Number of tabulating machine operators required, for example, would vary with business volume

8. **Re-train employees to perform their new jobs as necessary.**

Save Money, Time

areas not usually part of the accounting function.

Management complained that important reports were delivered too late to be effective. Daily and monthly reports often were weeks late. To keep up, accounting employees had to put in a lot of overtime.

The study showed the following reasons for inefficiency:

1. Accounting responsibility covered too diversified an area.
2. The production department often held up paper work that was needed to complete reports.
3. Employees' work loads were extremely unbalanced.
4. Some of the paper work that required most handling time was of little value.
5. There was considerable duplication between accounting and other departments.

Payoff—Again, techniques outlined in the accompanying check list were followed. Reports got out on time. Jobs were done faster, and employees got a morale boost resulting from rebalanced work loads. Extra time immediately was diverted to areas that had been long neglected and needed attention.

As the result of another study, a wire drawing mill reduced plant operating personnel on salary by 20 per cent, saving $10,000 a year.

Will office automation reduce the need for engineered control over office payroll costs? It's unlikely. Basically, cost control depends on the best utilization of resources, with sound work flow and work allocation patterns. When you put in expensive equipment, it's all the more important that you use it properly.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, *Penton Bldg., Cleveland 13, O.*

Fork Truck Future

Small users are big business in lift truck market, says Yale. Coming: More customer service

BY 1960, fork lift truck sales (gas and electric) will be 50 per cent higher than the industry's $215 million in sales last year, predicts Elmer F. Twyman, vice president, Yale & Towne Mfg. Co.

Yale's confidence in the future is backed by its announcement of a new line of gas and electric fork lift trucks. The research and manufacturing program to develop the new line took three years, cost $5 million.

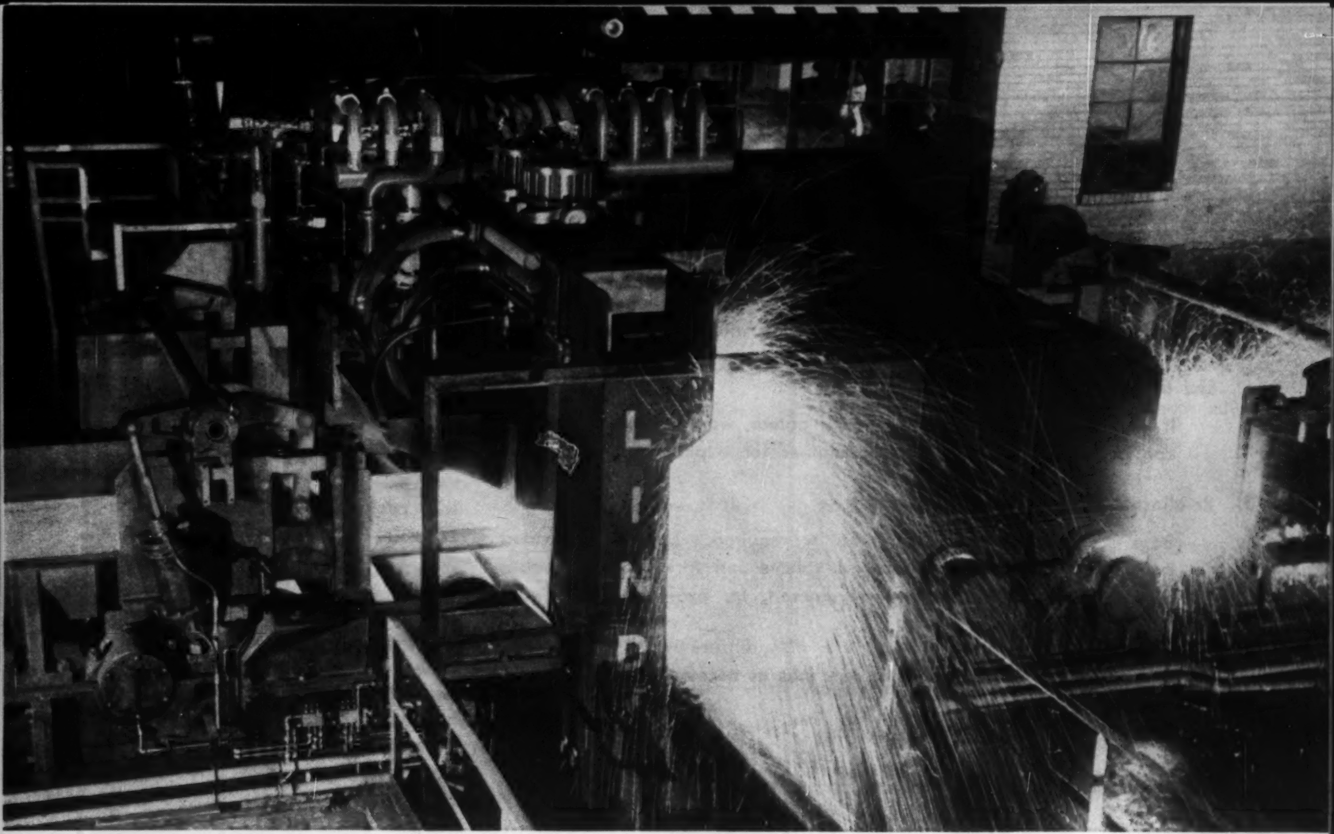
Statistics—A good share of the fork truck industry's optimism is based on statistics: In 1940, sales were $30 million. Last year's total was more than seven times that amount. In 1955, the combined total for gas and electric fork lift trucks was 41,329 units (27,529 gas, 13,800 electric).

New Look—Climbing labor and material costs are making the small manufacturer a more important customer for fork lift truck makers. Explains Mr. Twyman: "Almost 40 per cent of our industry's business is being done with the smaller user."

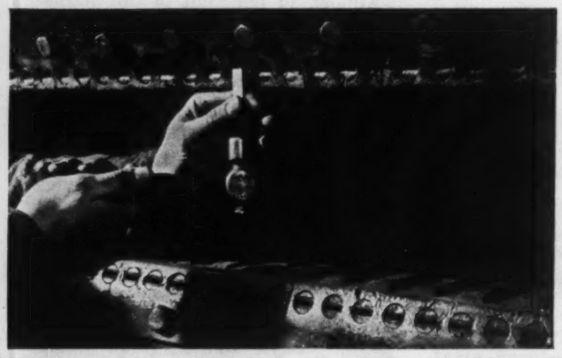
With the entire fork truck industry expanding, Mr. Twyman points out that increased competition within the industry is bringing such benefits as better service and engineering to the user. Yale also offers a leasing and time payment plan for customers and dealers which it says is playing an important role in its distribution program. Says Mr. Twyman about 1956: "Yale's fork lift truck sales will increase at least 20 per cent over its peak year (civilian sales) in 1955."

Galvanizers Predict Good Year

Hot dip galvanizers are looking for their business volume this year to be at least as big as it was last year. Barring a steel shortage, jobbing shops anticipate an increase in sales. This was the view of members attending the 21st annual meeting of the American Hot Dip Galvanizers Association Inc., at Chicago.



How Great Lakes Steel *planes* quality



144 BURNER JETS automatically plane both top and bottom of slabs to remove surface cracks and impurities.

HAND SCARFER double checks slabs to make certain that any flaws extending below surface are also removed.

Just a dramatic picture of a steel mill in action? Far from it! These sizzling-hot sparks tell another very important story about the special care that goes into making steel at Great Lakes.

They're bouncing out from beneath the burner jets of the automatic hot scarfing machine. Scarfing? Just as you plane wood to get a smooth, flawless surface, so does the scarfer automatically burn away the top and bottom "skin" from each slab of steel. Then, jets of water sweep the slab clean.

The end result: you get a higher quality, deep-drawing sheet with an inherently flaw-free surface. That's one more important reason why you should call Great Lakes about your steel needs. And remember, Great Lakes customers get what they call for.

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Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

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Auto Makers Pile Up Steel

Inventories mount as a hedge against possible steel price increases or a strike this summer. Auto production is beginning to revive

STEEL INVENTORIES are piling up in auto plants as the industry looks ahead to ferrous price increases, a possible steel strike, and a pickup in auto production.

Detroit warehouses are bulging, too. Partmakers will follow the leaders in assuring themselves enough steel to meet demands. One warehouse salesman says that it looks like stainless steels are in highest demand. He adds that he has a half-dozen customers for any stainless he gets.

In the main, the inventory buildup is natural. Auto makers are taking all the steel they ordered early in the year, even though production is down from last year's levels. It probably will stay that way through this month.

Cancellations—Companies which canceled steel orders in the first quarter are trying to get back on the books. One car builder has pushed its June orders 50 per cent above its April bids. Some companies are going outside regular sources to get more sheet steel. Since they buy in volume, smaller users may be hurt. At least one major steel company has expressed concern about auto makers' stockpiling. It plans to study the problem.

Besides sheet, steel salesmen report that stainless also is coming back since the 20 to 30 per cent cutbacks in the automotive take of the first quarter. Bar steels, fasteners and wire stocks still aren't in great demand by the auto industry.

Takers—Two auto companies say they are not increasing May orders, but admit the picture for June still isn't clear. These firms didn't cut back earlier orders. Steel they are receiving is building their inventories to almost double a normal, one-month supply.

One purchasing agent for a major auto firm sums it up this way: "Production estimates were so favorable at the tag end of '55 that most of us ordered more steel than we planned to use. When the seasonal slump hit, some people got scared and canceled. Now it looks like our original estimates were right. There won't be any more cancellations."

That's the basic reason, but the industry also wants to cover itself as far as possible against two other factors. One is price hikes in steel; the other is the possibility of a strike which would cut off steel supplies.

Prices—Carbuilders would like to get all the steel they can now in case prices go up. They are heeding Ernest T. Weir, chairman of National Steel Corp., Pittsburgh, who recently pointed out that steel companies will have to raise prices to get money for much needed expansion.

Capacity orders also reflect the possibility of a steelworkers' strike this summer. Although one auto company says it doesn't think there will be a strike, other sources aren't too sure. A Detroit labor expert explains: "Industry generally is making more money and expanding faster than ever before. The demand for steel is greater than the supply. This puts steel companies in a pretty poor bargaining position as far as the unions are concerned."

Output—In any event, the automobile industry isn't taking any chances. Production for the second quarter is projected at about 1.8 million cars, according to *Ward's Automotive Reports* (see table).

Although unsold dealer stocks are estimated to be around 850,000, the industry expects this figure will be pared substantially by the end of May. Production, however, should be up by the end of this month. Good output probably will continue until the close-out period in late summer. Right now, the companies are juggling production to balance unsold stocks.

Confidence—The situation boils down to this: Auto makers are facing their second highest production year in history—a situation many didn't think possible after 1955's record year.

The return to a more normal first quarter sales slump, plus soaring dealer stocks, scared some industry men. They forgot to listen to experts like General Motors' Harlow Curtice who told them another good year was in the works. These mixed emotions account for the

U.S. Passenger Car Production

(In millions)

	Second Quarter	First Quarter
1956	1.79*	1.75†
1955	2.12	2.13
1954	1.53	1.42
1953	1.73	1.51
1952	1.20	.99

* Projected
† Preliminary
Source: Ward's Automotive Reports

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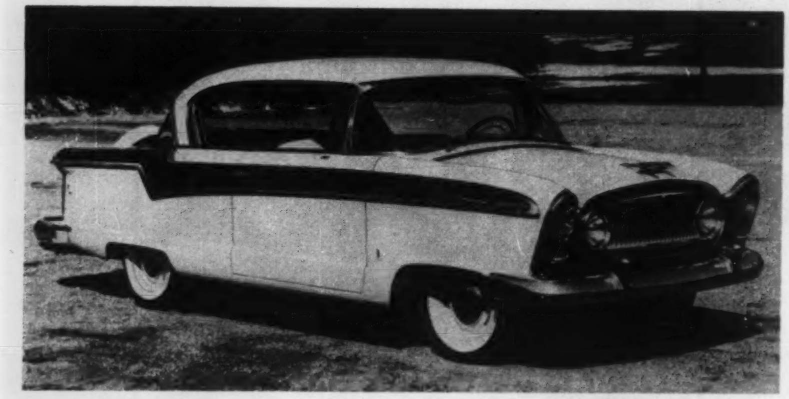


AMC introduces its V-8 in the Nash Ambassador Special

This new series is powered by American Motors' 190-hp V-8 engine. It comes in four-door and hardtop models. Price: About $2400. Over-all length is 202 in., with a 114-in. wheelbase. Hudson will announce its entry into the V-8 field in a few weeks

boom-and-bust predictions that have been coming from Detroit in the last three months.

Confidence is returning. Economists predict a continued high rate of business for the next two quarters, followed by a fourth quarter upsurge sparked by 1957 model introductions.

The auto industry will need all the steel it planned on. Heavy buying is predicted because there isn't enough to go around.

Ford Awards Contracts

Ford Motor Co., Dearborn, Mich., has granted construction contracts for its Rawsonville, Mich., plant.

A structural steel contract has been awarded to Taylor & Gaskin Inc., Detroit. Steel erection is expected to start in May, says John S. French, general manager of Ford's Parts and Equipment division.

The Rawsonville plant will make powdered metal items, instrument clusters, carburetors and other automotive parts. Originally scheduled for 600,000 sq ft, it will cover 780,000 sq ft to include staff and engineering office space for the Parts & Equipment division.

Partial production is scheduled this fall. The plant will be finished in mid-1957.

Sights Banner Year

Another banner sales year is in sight, says J. F. Wolfram, general manager of GM's Oldsmobile division.

Mr. Wolfram bases his prediction on record used car sales by Oldsmobile dealers, coupled with a new high in used car price retention.

He points out that used car sales are an excellent barometer of new car sales trends. Oldsmobile has maintained a 2-to-1 ratio in used car sales in the last 14 months.

U. S. Auto Output

Passenger Only

	1956	1955
January	611,190	659,508
February	554,667†	674,951
March	575,100†	792,436
April		752,245
May		723,868
June		648,412
July		658,696
August		613,705
September		460,443
October		517,788
November		749,061
December		682,256
Total		7,933,369
Week Ended	1956	1955
Mar. 3	132,889	167,811
Mar. 10	132,840	171,346
Mar. 17	131,207	176,194
Mar. 24	131,287	178,068
Mar. 31	126,580†	177,295
Apr. 7	128,000*	168,002

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

"Our used car sales for the first two months of 1956 are running more than 4 per cent higher than the same period in 1955," Mr. Wolfram reports.

New Cars—Meanwhile, Oldsmobile dealers delivered 12,069 new cars in the second ten days of March. This is about the same delivery rate as the first ten days of the month and only about 4 per cent lower than last year's. Retail sales from Jan. 1 through Mar. 20 total 107,623 new cars.

AMA Reports High Sales

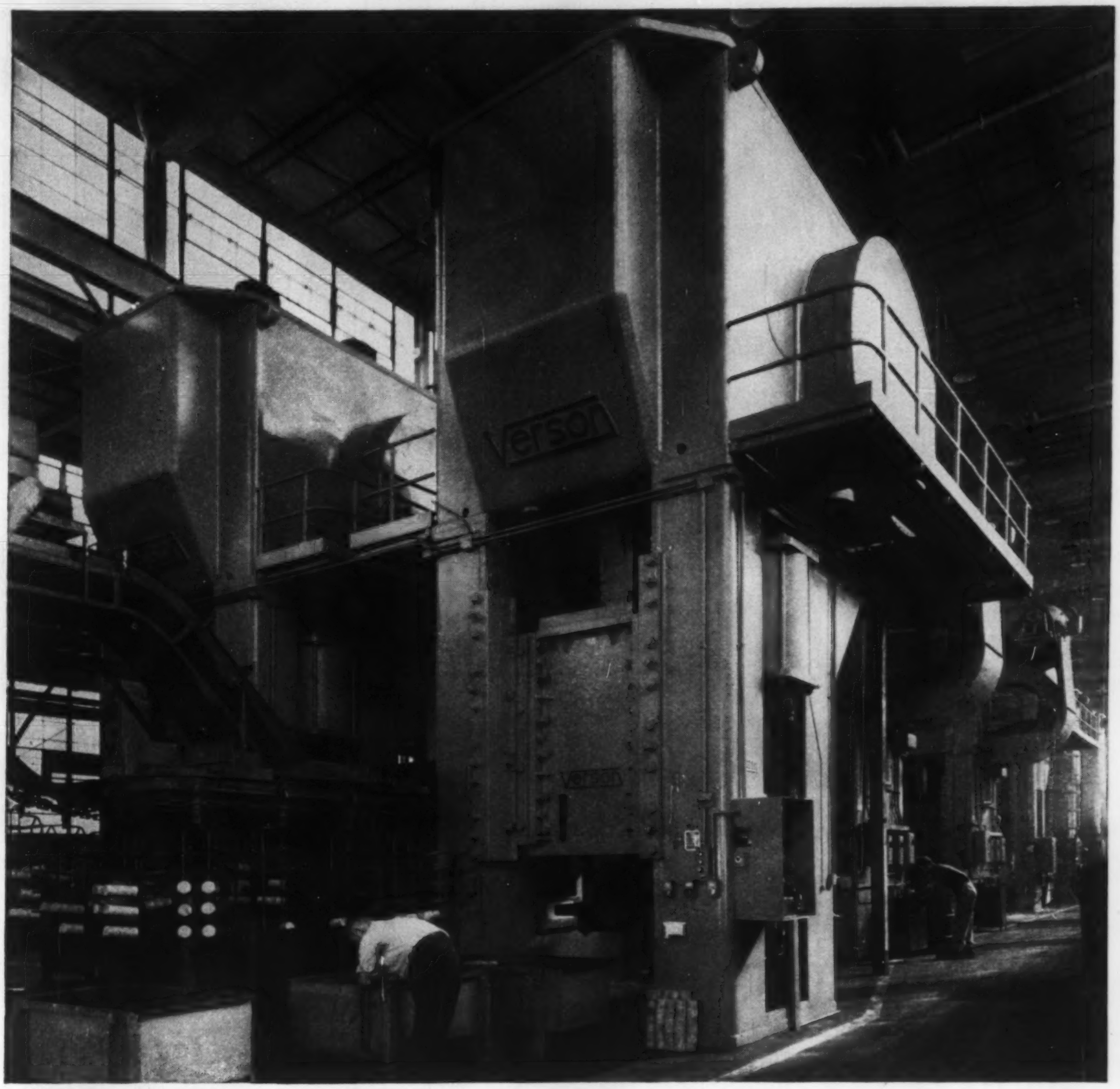
Factory sales of trucks to both domestic and foreign markets were about 22 per cent higher during the first two months of this year than in the same period last year, says the Automobile Manufacturers Association, Detroit.

Truck sales for January and February of this year totaled 201,352, compared with 156,737 in 1955. Domestic market sales took 167,504 trucks this year. Last year sales in the U. S. accounted for 129,200.

Passenger car sales for the same period were 116,000 less than the 1,313,218 cars sold in 1955. Foreign sales of all vehicles produced in this country were 5.9 per cent of the total, compared with 5.5 per cent a year ago.

Exhaust Notes

American Motors Corp., Detroit, announces price increases ranging from $22.80 to $30.40 on all '56 cars. Concurrently, it reports freight charge cuts which almost offset the price hikes. . . A consumer finance survey conducted by the University of Michigan and the Federal Reserve Board reveals that the number of persons planning to buy new cars this year is just about as high as it was in 1955. Eight per cent of the consumers interviewed said they plan to buy new cars; seven per cent are in the market for used models. The FRB warns: "Intentions to buy should not be taken as a forecast of what consumers will buy." Credit, price changes and general business conditions may affect consumers' plans.



Verson

ECCENTRIC PRESSES head the line at Heintz Manufacturing Company

● The two Verson Eccentric Presses illustrated above are each rated at 1500 tons with 4500 tons drive capacity. The presses are a key part of the cold extrusion lines at Heintz Manufacturing Company, Philadelphia, said by many to be "the birthplace of cold extrusion of steel in America." Both presses are specially designed with fast operating speeds to fit the production process.

Like all Verson Eccentric Presses, these represent the ultimate in mechanical press design. They provide power, strength, resistance to deflection, accuracy and efficiency unmatched by any other mechanical presses. This design coupled with Verson production know how means that when you select a Verson press, you get more than just a press. You get a production tool, tailored to your requirements as an integrated part of your production process.

It will pay you to take advantage of Verson experience in the expansion or modernization of your facilities. With a long list of advancements to its credit, Verson may be able to show you the way to lower unit production costs. For specific recommendations, send an outline of your requirements.

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MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TOOLING •
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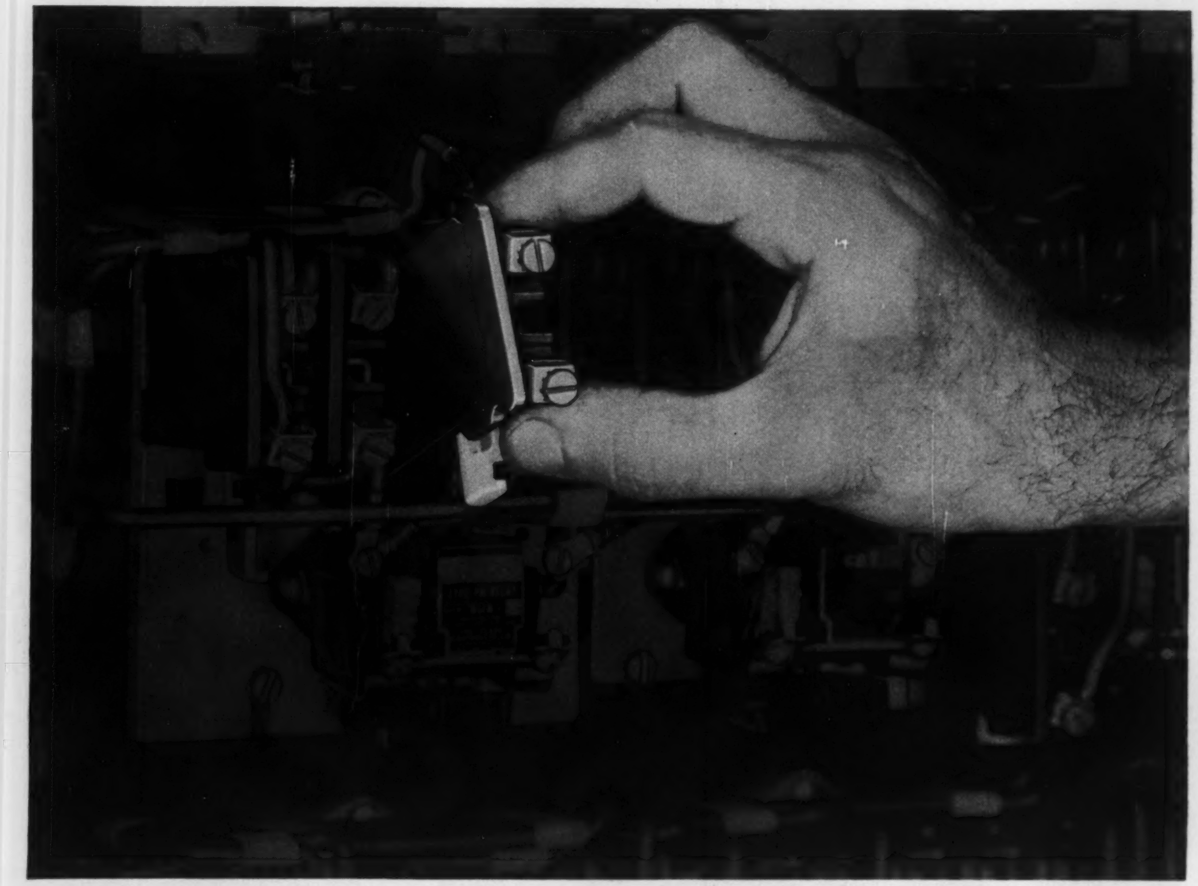


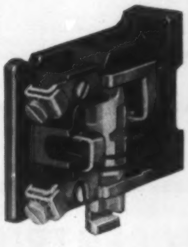
You can easily remove a single pole from any CLARK Type "PM" Relay

Each pole in the new CLARK heavy-duty relays is an integral unit that can be quickly removed or replaced *from the front* without disturbing other poles. You need disconnect only two wires and loosen one mounting screw—regardless of the number of poles in the relay. Compare this with other types of relays where the whole device must be removed to accomplish the same thing. For example, with a conventional 6 pole relay, 14 wires and 3 mounting screws must be removed.

All terminals are located on the front. They are "pressure" type, eliminating need for looping wire. Coil-changing and magnet replacement can also be done quickly from the front without removing relay from panel.

Write for Bulletin PL-7305

Each pole is contained in its own melamine housing.



A short circuit through one set of contacts is confined to a single pole and will not destroy the whole relay. Enclosed top protects from dust and dirt, and serves as wiring shelf.

The CLARK CONTROLLER Company

Engineered Electrical Control **1146 East 152nd Street • • Cleveland 10, Ohio**

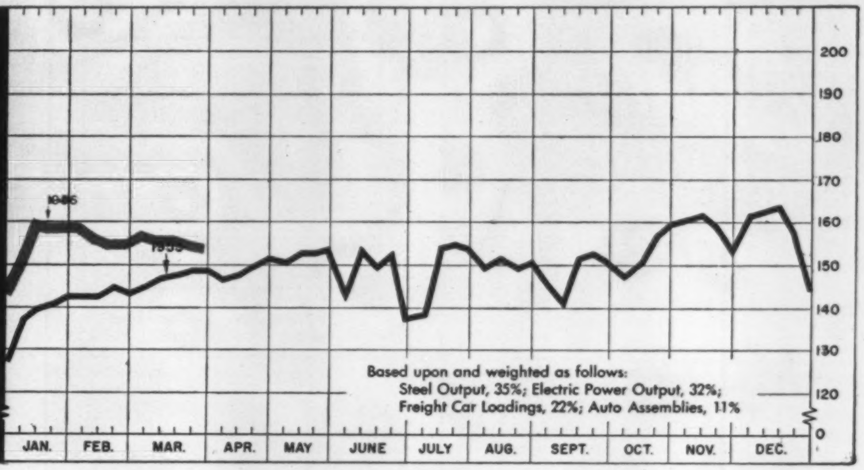
IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

STEEL

INDUSTRIAL PRODUCTION INDEX

(1947-1949=100)

LATEST WEEK	155*
PREVIOUS WEEK	156
MONTH AGO	156
YEAR AGO	149



Based upon and weighted as follows:
Steel Output, 35%; Electric Power Output, 32%;
Freight Car Loadings, 22%; Auto Assemblies, 11%

*Week ended Mar. 31

Inventory-Backlogs Remain in Balance

INVENTORIES are rising, but they are not out of proportion because unfilled orders are gaining at a more rapid pace.

According to the Department of Commerce, order backlogs climbed 1.9 per cent in January while inventories edged up only 0.72 per cent.

Backlogs—At the end of December, manufacturers' unfilled orders stood at $55,491,000,000. New orders in January, although down from December to $27,533,000,000, still exceeded production, which was down slightly to $26,464,000,000. The difference, added to unfilled orders, resulted in a new backlog level of $56,560,000,000.

In the light of this future business, manufacturers are not too worried about high-level inventories. It takes raw materials to make finished goods, and the more orders you have for finished goods, the more inventory you need.

Balance—The backlog-inventory position is not expected to change much during the present quarter. Production ceilings will keep it pretty well in check. Steel mills, which are running close to capacity, are selling all they can produce, and the only customers suspected of piling up much inventory are the auto makers. This is not considered dangerous because those stocks will dwindle rapidly when new models make their appearance, if not before. Most other steel users are busy working off backlogs built up while motordom was putting the pinch on steel last year. Some are trying to lay up a store of materials in case there is a steelworkers' strike, but most are having a hard enough time even meeting record production schedules.

Watch new orders: They'll give a clue as to business conditions later this year. If they continue to outstrip production, backlogs will rise and sustain high-level operations throughout the year. Most indications are favorable.

Good News—Dravo Corp. reports that bookings in the first two months of 1956 increased its backlog by nearly three times. At De

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,439[1]	2,452	2,300
Electric Power Distributed (million kw-hr)	11,150[1]	11,134	9,804
Bitum. Coal Output (1000 tons)	9,910[1]	9,230	7,910
Petroleum Production (daily avg—1000 bbl)	7,155[1]	7,163	6,807
Construction Volume (*ENR*—millions)	$459.5	$501.3	$335.8
Auto, Truck Output, U. S., Canada (*Ward's*)	160,583[1]	167,519	218,437
TRADE			
Freight Car Loadings (1000 cars)	695[1]	697	659
Business Failures (Dun & Bradstreet)	230[1]	208	237
Currency in Circulation (millions)[3]	$30,249	$30,264	$29,738
Dept. Store Sales (changes from year ago)[3]	+9%	−3%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,217	$23,977	$19,054
Federal Gross Debt (billions)	$276.3	$277.7	$274.2
Bond Volume, NYSE (millions)	$15.9	$22.4	$14.9
Stocks Sales, NYSE (thousands of shares)	11,391	14,088	14,082
Loans and Investments (billions)[4]	$86.5	$85.3	$84.0
U. S. Govt. Obligations Held (billions)[4]	$28.7	$28.4	$33.5
PRICES			
STEEL's Finished Steel Price Index[5]	209.10	209.10	194.53
STEEL's Nonferrous Metal Price Index[6]	278.3	285.3	235.9
All Commodities[7]	112.9	112.8	110.5
Commodities Other Than Farm & Foods[7]	120.8	120.7	115.5

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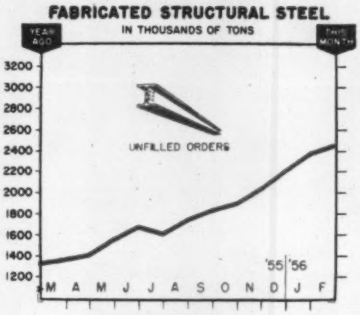
*Dates on request. [1] Preliminary. [2] Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3] Federal Reserve Board. [4] Member banks, Federal Reserve System. [5] 1935-1939=100. [6] 1936-1939=100. [7] Bureau of Labor Statistics Index, 1947-1949=100



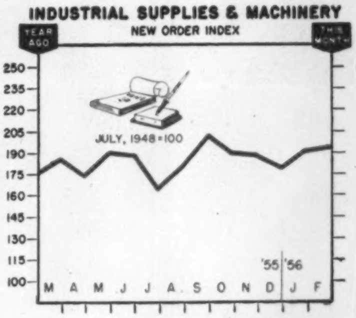
FABRICATED STRUCTURAL STEEL

IN THOUSANDS OF TONS

	Shipments		Backlogs	
	1956	1955	1956	1955
Jan. ...	251.5	225.8	2,408	1,346
Feb. ...	283.4	213.4	2,476	1,360
Mar. ...	....	227.8	....	1,392
Apr. ...	....	239.7	....	1,444
May ...	....	223.2	....	1,592
June ...	....	282.3	....	1,706
July ...	....	219.4	....	1,639
Aug. ...	....	268.0	....	1,776
Sept. ...	....	289.1	....	1,854
Oct. ...	....	283.8	....	1,928
Nov. ...	....	258.9	....	2,075
Dec. ...	....	248.0	....	2,243
Total		2,979.4		

American Intitute of Steel Construction

Charts copyrighted, 1956. STEEL



INDUSTRIAL SUPPLIES & MACHINERY

NEW ORDER INDEX

	1956	1955	1954
Jan.	192.7	164.4	139.8
Feb.	195.9	175.1	140.5
Mar.	....	186.9	141.5
Apr.	....	173.7	131.9
May	....	191.6	129.4
June	....	189.1	136.4
July	....	163.7	119.4
Aug.	....	181.2	132.5
Sept.	....	203.2	148.1
Oct.	....	190.0	136.3
Nov.	....	189.7	146.2
Dec.	....	180.0	148.8

Amer. Supply & Machinery Mfrs'. Assn.

Laval Steam Turbine Co., January and February brought an increase of about one-third in the backlog. The Resistance Welder Manufacturers' Association reports new orders worth $6,217,000 for February, eclipsing the former record set in January by 12 per cent. Members had a record backlog of $18.8 million on Mar. 1. New orders for fabricated structural steel outdistanced shipments by 199,116 tons during January and February, resulting in a backlog boost to almost 2.5 million tons (see chart above). These examples could be multiplied many times.

STEEL's Index Hits Low Point

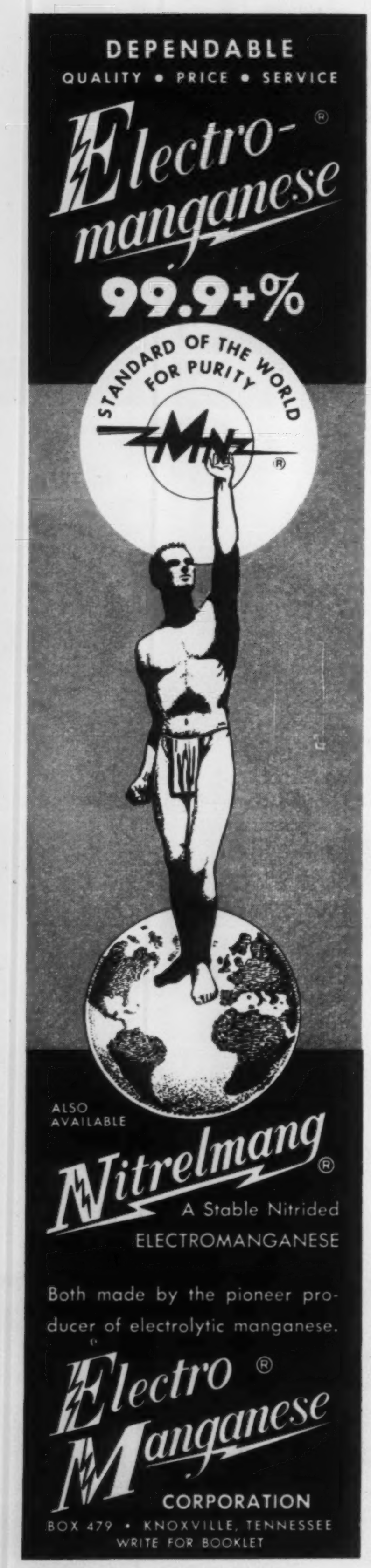
Reports of capacity operations are a dime a dozen; yet STEEL's industrial production index shows there must be a weakness. It is in motordom. Because of cutbacks in auto production, the index dipped to 155 (1947-1949 = 100) for the week ended Mar. 31. This was the lowest point since the holiday week of Jan. 7. Almost all the decrease from the previous week's 156 mark was accounted for by the auto makers. Production came to 126,580 cars, says *Ward's Automotive Reports,* as several plants closed down on Good Friday. That was the lowest total in five weeks. And it's going to get worse before it gets better. April output is scheduled 5 per cent below March production of an estimated 575,000 assemblies, all in the continuing attempt to pare dealers' inventories. On Mar. 31, stocks stood at 39 or 40 days, down from 43.4 days on Feb. 29.

Wright Looks Into 1957

Despite the automobile inventories, you can't brush off a statement by J. D. Wright, president of Thompson Products Co., a major supplier for the auto and aviation industries. He predicts: Sales for 1956 should at least equal or exceed 1955 volume, and 1957 should break the company's sales record set in 1953. He thinks auto production in 1957 will come close to 7.7 million units, nearly the volume produced in record 1955. The 1956 estimate is based on auto production of 6.7 million units and truck production near the 1955 level.

Public Construction Jumps

One of the biggest factors keeping business spirits up is heavy construction, which chalked up contracts totaling $459.4 million in the



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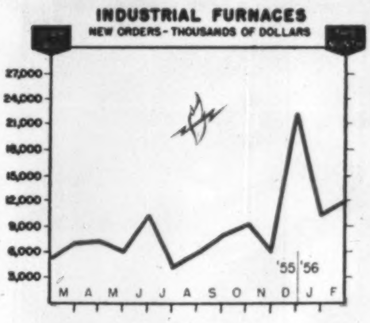

	1956	1955	1954
Jan.	10,244	4,973	3,086
Feb.	12,163	5,616	3,086
Mar.	....	7,345	4,079
Apr.	....	7,639	3,496
May	....	6,205	5,848
June	....	10,616*	5,663
July	....	4,338	1,664
Aug.	....	6,273	2,570
Sept.	....	8,351	2,534
Oct.	....	9,568	3,837
Nov.	....	6,180	3,188
Dec.	....	22,548*	6,847

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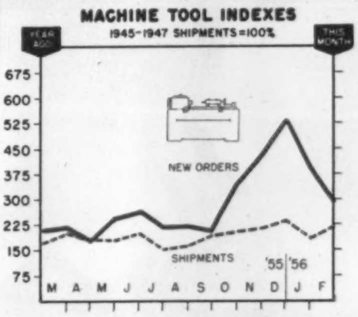
*June includes $4,804,418 in steel mill furnace orders for first half. December includes $11,443,071 in steel mill furnace orders for second half.

Industrial Heating Equipment Assn. Inc.



	New Orders		Shipments	
	1956	1955	1956	1955
Jan.	389.6	203.0	184.7	167.3
Feb.	290.8*	209.4	218.4*	168.2
Mar.	....	214.6	....	202.5
Apr.	....	178.1	....	180.1
May	....	243.7	....	180.9
June	....	263.2	....	198.8
July	....	217.8	....	152.9
Aug.	....	221.3	....	164.6
Sept.	....	207.3	....	195.4
Oct.	....	347.1	....	204.2
Nov.	....	433.3	....	214.2
Dec.	....	534.1	....	237.8

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*Preliminary

National Machine Tool Builders' Assn.

week ended Mar. 29, according to *Engineering News-Record*. Public construction, at $214.3 million, was the highest it has been for a week since January. Cumulative totals for the first 13 weeks of the year put 1956 about 32 per cent ahead of 1955.

Railroads Expect Increase

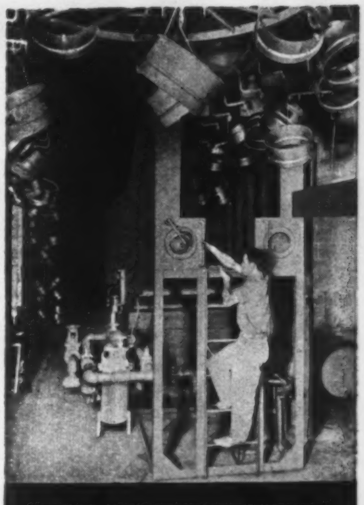
Carloadings in second quarter will be 5.2 per cent above the same period last year, say the 13 regional Shippers Advisory Boards. The estimates run from an increase of 12.8 per cent for the Ohio valley area to a decrease of 0.2 per cent for the Great Lakes region. Shippers in the Great Lakes region expect a decline of 16 per cent in automobile and truck shipments to cancel out big gains in machinery and boilers, paint and lumber products shipments. New England railroads expect to show the second largest gain of 11.6 per cent. Loadings during the week ended Mar. 24 amounted to 698,248 cars, reports the Association of American Railroads.

Employment Upturn Coming

Secretary of Labor James P. Mitchell says that all but 19 of 149 major labor market areas surveyed by the Labor department's Bureau of Employment Security anticipate sizable job gains to mid-May. Biggest gains will be in seasonal activities, such as construction, but durable goods also expect improvement. Small to moderate gains are expected by metalworking industries.

Trends Fore and Aft

- Salesmen for the Delta Power Tool Division of Rockwell Mfg. Co. expect sales increases ranging from 10 to 40 per cent in their regions during 1956.
- "There were those who looked upon 1955 business levels as a high peak from which there had to be a downturn . . . What looked like a peak in 1955 now seems to be just a camp site on a climb to a whole new mountain range," says *Building Business*, F. W. Dodge Corp.
- Since the beginning of the year, the Bureau of Labor Statistics' wholesale price index for all commodities has risen from 111.4 to 112.9 (1947-1949 = 100). All commodities other than farm and foods have gone from 119.5 to 120.8.
- Department store Easter sales were a disappointment this year.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Add to this a substantial increase in production, and you realize the higher efficiency NuTone has achieved, while saving more than $900 per week!

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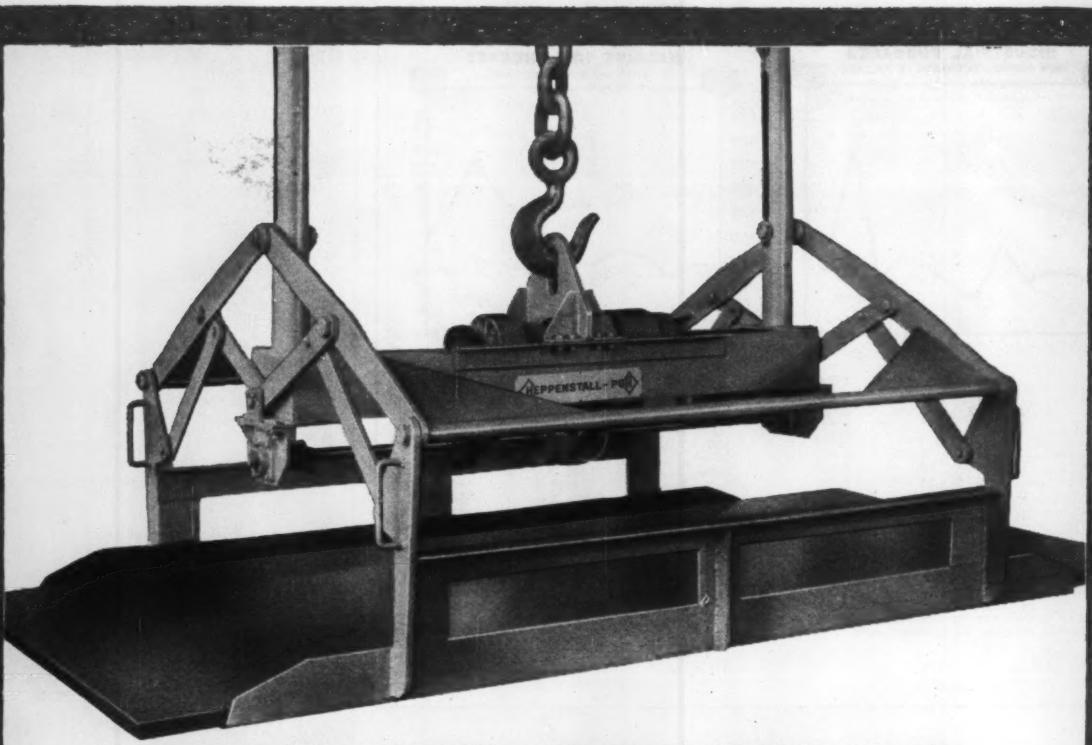

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with the new Heppenstall Sheet Lifter

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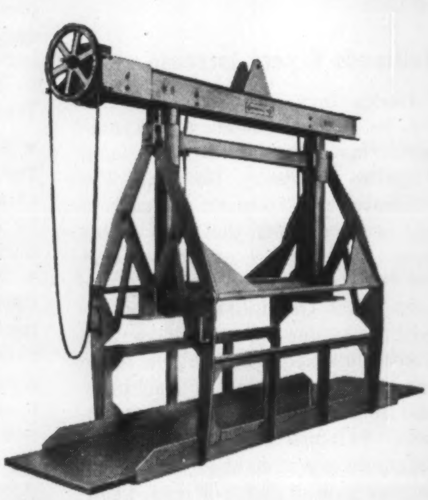
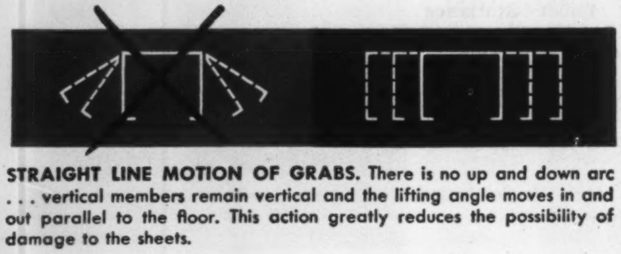
1. **No manual adjustment required for sheets of different widths.**
2. **Decreases sheet damage because of straight line motion of lifting arms.**
3. **Cannot lose load because of self-locking brake.**
4. **Available in hand or motor operated models.**
5. **Unlimited capacities.**
6. **End Grabs for use with very wide or very long sheets can be added as optional equipment.**
7. **Designed to fit any crane block and hook equipment.**



MANUALLY OPERATED SHEET LIFTER: Available with either chain or wheel operation.



STRAIGHT LINE MOTION OF GRABS. There is no up and down arc . . . vertical members remain vertical and the lifting angle moves in and out parallel to the floor. This action greatly reduces the possibility of damage to the sheets.

TONGS FOR EVERY LIFTING PROBLEM

HEPPENSTALL COMPANY

NEW BRIGHTON, PA.

HENRY C. MILLER
. . . Axelson department sales mgr.

Henry C. Miller was appointed national sales manager, milling machine department, **Axelson Mfg. Division,** U. S. Industries Inc., Los Angeles. He was assistant sales manager and assistant to the general manager, Elmes & King Division, American Steel Foundries Co.

George R. Hanks, president of **American LaFrance Corp.,** Elmira, N. Y., was elected chairman and chief executive officer. He is succeeded as president by **James F. Connaughton,** former vice president and director of Baldwin-Lima-Hamilton Corp.

John A. Butz was made chief engineer at **Stewart Die Casting Division** of Stewart-Warner Corp., Chicago.

Pressed Metals of America Inc., Port Huron, Mich., promoted **Edmund West** from plant manager and assistant treasurer to vice president-manufacturing. **Donald J. Clark** was promoted from sales representative to sales manager. **Louis J. Aure** fills the new post of chief engineer.

Boyer - Campbell Co., Detroit, elected **R. G. Campbell** president and general manager and **John F. Phillips** vice president.

Robert N. Eslyn was named manager of sales planning, **Kennametal Inc.,** Latrobe, Pa.

RICHARD D. DARRAH
. . . Patterson Foundry v. p.-sales mgr.

Richard D. Darrah was made vice president and sales manager of **Patterson Foundry & Machine Co.,** East Liverpool, O. He was sales manager, industrial conditioning division, Dravo Corp.

Gardner-Denver Co., Quincy, Ill., appointed **William B. Knoderer** sales manager, industrial division and **Niel M. Fishback** sales manager, mining and contracting division. Mr. Knoderer was sales manager of Keller Tool Co. before it merged with Gardner-Denver.

John E. Eckert was appointed vice president and chief engineer, **Armzen Co.,** Waterbury, Conn. **James F. Fox** was made vice president and sales manager and **Michael G. Sendzimir** treasurer.

Formsprag Co., Van Dyke, Mich., elected **Charles F. Trapp Jr.** vice president-sales and **L. T. Szady** vice president-engineering.

Robert K. Beck was elected executive vice president of **Brush Beryllium Co.,** Cleveland. He was president of Apex Smelting Co., Chicago.

Clarence I. Ochs retired as board chairman of **Eaton Mfg. Co.,** Cleveland, but will continue as a director and chairman of the executive committee. He is succeeded by **H. J. McGinn** who continues as president.

LEONARD J. COGAN
. . . Graver Tank & Mfg. sales mgr.

Leonard J. Cogan was made sales manager of **Graver Tank & Mfg. Co. Inc.,** with headquarters at the Chicago office. He was assistant manager of eastern sales at Philadelphia. In his new post he is responsible for all sales, except those of Mid-Continent Division, Graver Construction Co. Inc. and Graver Water Conditioning Co.

Robert L. Fairbank, sales manager of **Towmotor Corp.,** Cleveland, was elected vice president. **David A. Quere** was made assistant controller.

Arthur W. Bollard joined **Colonial Iron Works Co.,** Cleveland, as general manager of its new Bollard Asphalt Plant Division. He was vice president and secretary of F. D. Cummer & Son Co.

Lloyd L. Kelly, general sales manager, **Link Aviation Inc.,** Binghamton, N. Y., was elected vice president-sales, a new position.

Granite City Steel Co., Granite City, Ill., appointed **Herbert D. Roy** plant engineer; **Eugene Whitaker,** chief mechanical engineer; **Raymond Barr,** assistant to the chief engineer, a new post.

Baldwin-Lima-Hamilton Corp. appointed **Robert R. Lent** west coast co-ordinator for its electronics and instrumentation division in the guided missile program. He has

ALFRED H. STULLICK
. . . Superior Brass foundry supt.

HAROLD RUEHL
. . . Erickson Tool chief engineer

EDWIN R. FELLOWS II
. . . Fellows Gear Shaper v. p.-gen. mgr.

headquarters in Los Angeles. Mr. Lent was with Reaction Motors Inc., Washington.

Alfred H. Stullick was made foundry superintendent of **Superior Brass Works Inc.,** Detroit. He formerly served in a similar capacity at Attwood Brass Works Inc. **Peter Jelby,** former foundry superintendent, was made chief engineer.

Joseph Montgomery was made general sales manager, **Elox Corp.,** Clawson, Mich. He was in charge of foreign sales.

Steel Co. of Canada Ltd., Hamilton, Ont., appointed **H. E. Stipe** assistant vice president, sales division; **C. H. Mulveney,** general sales manager, rolling mill products; **C. P. Short,** general sales manager, finishing mill products; and **K. B. MacNaughton,** assistant general sales manager, rolling mill products.

Raymond M. Maloney was made assistant to the sales manager, **Continental Screw Co.,** New Bedford, Mass. He was a sales engineer.

Wilbur E. Kelley was elected president of **Walter Kidde Nuclear Laboratories Inc.,** Garden City, L. I., N. Y. He succeeds **Henry K. Norton,** now chairman. Mr. Kelley was general manager, New York operations office, Atomic Energy Commission. More recently he was vice president-engineering for Catalytic Construction Co.

Harold Ruehl was made chief engineer by **Erickson Tool Co.,** Cleveland. He succeeds the late **Robert F. Jacobs.**

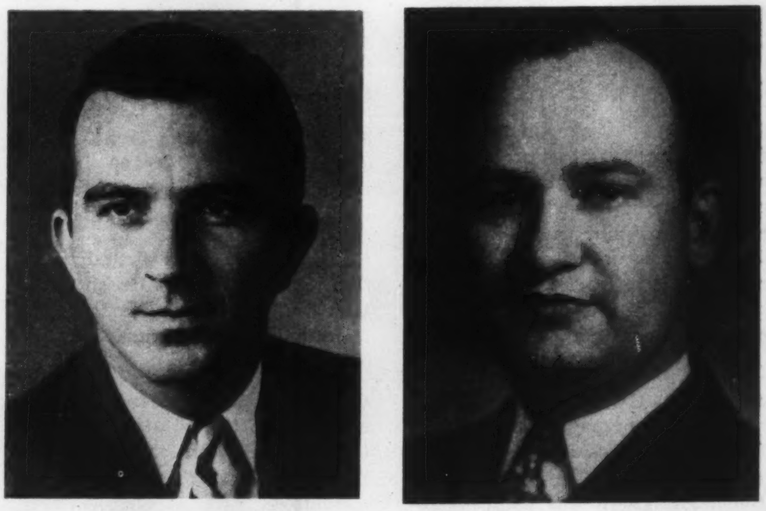
International Business Machines Corp. appointed **Charles J. Lawson Jr.** general manager of its Rochester, Minn., manufacturing plant and **Edward L. McCall** general manager of its Greencastle, Ind., plant. Mr. Lawson was assistant general manager, Poughkeepsie, N. Y., plant. Mr. McCall was assistant manager-engineering for card operations at the Endicott, N. Y., plant. Construction of several plant buildings in Rochester will begin late this year.

Edwin R. Fellows II was elected vice president and general manager of **Fellows Gear Shaper Co.,** Springfield, Vt. He was assistant general manager and export manager. **Aldrien Carleton** was made export manager.

United Transformer Co. appointed **H. C. Hornickle** general manager of its Pacific Division, Los Angeles.

Carl J. Gilbert was elected president of **Gillette Co.,** Boston, to succeed **J. P. Sprang Jr.,** now chairman. Mr. Sprang succeeds **William A. Barron Jr.,** retired.

Robert G. Beeson was appointed



CHARLES J. LAWSON JR. **EDWARD L. McCALL**

. . . general managers of IBM manufacturing plants

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Here is a direct answer to the recurring problem of nickel shortage. For many users of chromium-nickel austenitic stainless steels, the new AISI 200-series of chromium-manganese low-nickel austenitic grades can be a source of immediate relief—and an avenue to the reduction and possible avoidance of nickel shortage problems in the future.

In many cases, you can switch directly from the older Type 301 and 302 grades to the new AL Stainless Type 201 and 202 steels, using the same fabricating processes and securing about the same results. There's nothing new to learn, and no loss in performance in practically all applications. In certain respects, these steels have better properties than the older materials and may be used to actual advantage in some cases.

We also produce low carbon grades of these chrome-manganese steels, arbitrarily designated Types 204 and 204L (similar to the older grades 304 and 304L) . . . as well as a lower-chromium, higher-manganese grade designated Type CM, which contains only 1% nickel. Allegheny Ludlum has pioneered in the development and application of these low-nickel stainless steels. We know what the new grades will do . . . let us help you put them to use. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

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. . . Revcor national sales mgr.

JOSEPH R. HAGER JR.
. . . Gar Wood manufacturing director

GLENN C. MERKLEY
. . . National Supply plant mgr.

railroad development engineer by **Kaiser Aluminum & Chemical Corp.**, Chicago.

Revcor Co., Carpentersville, Ill., appointed **Robert F. McCall** national sales manager. His background: 12 years of sales engineering with Black & Decker Mfg. Co. and three years of sales promotion with Barrett Christie Co.

Hiram A. Lerner was elected vice president of **Concord Steel Corp.**, New York. He was general manager of the Everett, Mass., warehouse. **Lewis Gelbert,** sales manager, also was elected a vice president of Concord Steel, as well as Concord Export-Import Corp.

Lt. Gen. Laurence C. Graigie, USAF (ret.), was appointed vice president-engineering of **Hydro-Aire Inc.**, Burbank, Calif.

Wilbur Jackson was named general manager, **Grayson Controls Division,** Robertshaw-Fulton Controls Co., Long Beach, Calif.

Joseph R. Hager Jr. was made director of manufacturing for **Gar Wood Industries Inc.**, Wayne, Mich. He formerly was works manager, transportation division, Baldwin-Lima-Hamilton Corp. **A. S. Wurfel** was made assistant director-manufacturing.

Barry Sedgwick joined **Whitman & Barnes,** Plymouth, Mich., division of United Drill & Tool Corp., as sales engineer. He was with Solar Aircraft Co. as a buyer of perishable tools and subcontract parts.

Henry L. Kaminski was made manager, methods development department, **Gemmer Mfg. Co.**, Detroit.

Norman J. Kimber, formerly works manager and chief engineer of **Wagner Iron Works,** Milwaukee, was named vice president. **Claire Murray** was made chief engineer and **Norbert Witte** fills the new post of product engineer. Mr. Murray continues in charge of development.

Glenn C. Merkley was appointed manager of **National Supply Co.'s** Torrance, Calif., plant. He is in charge of the steel, fabricating and plant staff departments.

W. R. Morgan, W. H. Fellows and **L. B. Bellamy** were elected vice presidents by **Abrasive & Metal Products Co.,** Detroit. Mr. Morgan will serve as vice president-general manager of Sterling Grinding Wheel Co., subsidiary at Tiffin, O. Mr. Fellows, in addition to overall duties with the parent company, continues sales direction of subsidiaries, Peninsular Grinding Wheel Division, Detroit, and Sterling Grinding Wheel. Mr. Bellamy, formerly general manager of operations for Sterling, will direct manufacturing operations of subsidiaries, including a new acquisition, Sta-Warm Electric Co., Ravenna, O.

Wendell S. Phillips was appointed New England and upstate New York regional manager of **Luria Building Products Inc.**, Bristol, Pa.

OBITUARIES . . .

Earl E. Knox, 71, president, **Earl E. Knox Compressor Co.**, Erie, Pa., died Mar. 19.

Harold T. Tudor, 63, founder and part owner of **Tudor Products Co.**, Bloomfield, N. J., died Mar. 21.

Alan Arensberg, 42, president, **Vesuvius Crucible Co.**, Pittsburgh, died Mar. 23.

Alfred D. Beeken Jr., 65, vice president in charge of sales, **Vulcan Crucible Steel Division, H. K. Porter Company Inc.**, at Aliquippa, Pa., died Mar. 26.

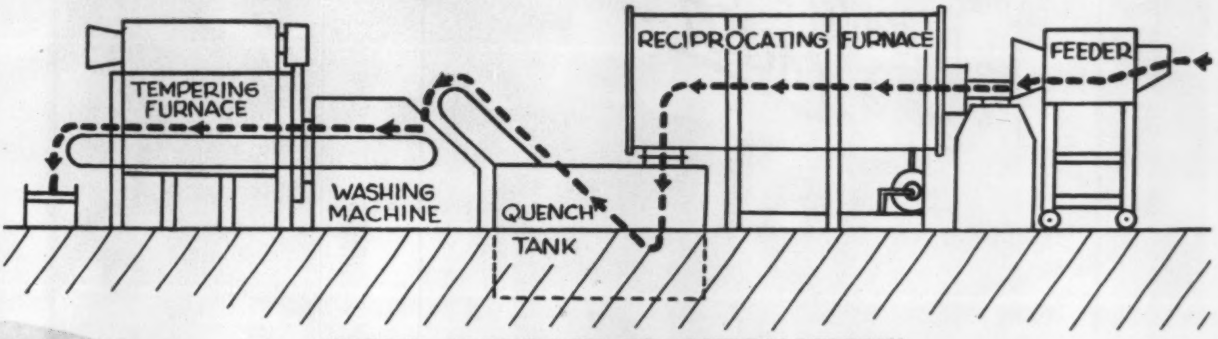
John A. McPhail, vice president and chairman of the executive committee, **Algoma Steel Corp. Ltd.**, Sault Ste. Marie, Ont., Canada, died recently.

Amos Ackley, 66, president, **R. W. Hartnett Co.**, Philadelphia, died Mar. 23.

William F. Bauer, 63, president, **Lyter Body Co.**, Philadelphia, died Mar. 24.

NOW

AUTOMATIC HEAT TREATING



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AGF RECIPROCATING MACHINES provide a completely controlled processing atmosphere, thus assuring highest quality work. The "shaker hearth" eliminates the use of mesh belts and conveyors operating at high temperatures. Reduction in maintenance and "down time" provides low operating costs.

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are a MUST...

In soaking pits, Johns-Manville Sil-O-Cel C-22 Insulating Brick provide outstanding performance as back-up insulation.

Specify

Johns-Manville SIL-O-CEL C-22 Insulating Brick

the diatomaceous silica brick that retains its high cold crushing strength of 700 psi throughout normal service range

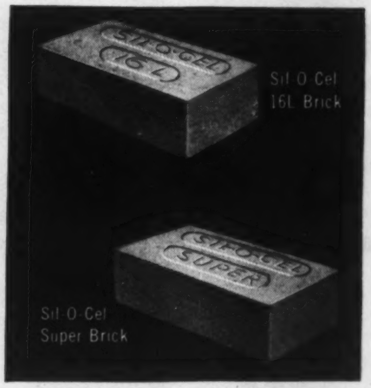
Because of its exceptional strength Sil-O-Cel C-22 Insulating Brick has gained wide acceptance as an all-purpose insulating brick. It is especially recommended for soaking pits, open hearth bottoms, slab heating furnaces, hot blast stoves, coke ovens and other high temperature equipment.

Millions of microscopic cells provide Sil-O-Cel C-22 brick with excellent heat resistance up to 2000F. It has a thermal conductivity of only 1.88 Btu in/sq ft/F/hr at 1000F mean temperature. In addition, with a density of 38 lb/cu ft, it is light and easy to handle.

For direct exposure or back-up to 1600F, use Sil-O-Cel 16L Insulating Brick. This newest member of the J-M diatomaceous silica insulating brick family has *less than 0.1% reversible thermal expansion at 1600F.* Conductivity is 1.07 Btu in/sq ft/F/hr at 1000F mean temperature with a density of 33-35 lb/cu ft. Cold crushing strength is 350 psi. Sil-O-Cel 16L serves equally well as back-up insulation or exposed refractory lining.

For back-up at higher temperatures, specify Sil-O-Cel® Super Insulating Brick with an unusually high temperature limit of 2500F.

Write today for further information on Sil-O-Cel Insulating Brick and Insulating Fire Brick. Ask for Brochure IN-115A. Address Johns-Manville, Box 60, New York 16, N. Y. In Canada, 565 Lakeshore Road East, Port Credit, Ontario.



JOHNS-MANVILLE JM PRODUCTS

Johns-Manville *first-in* **INSULATION**

MATERIALS · ENGINEERING · APPLICATION

Doehler-Jarvis To Expand

New diecasting machines at Toledo, O., plants will increase consumption of aluminum by 20 million lb a year. Grand Rapids, Mich., plant ups zinc use by 15 million lb

DOEHLER-JARVIS Division of National Lead Co. is increasing the capacity of its diecasting facilities by 20 million lb of aluminum and 15 million lb of zinc a year. Joseph A. Martino, president of National Lead, says completion of the project is scheduled for the middle of this year.

Bulk of the expansion will go into the Toledo, O., plants. At 1945 Smead Ave., additional aluminum diecasting machines will be installed, increasing metal consumption by about 10 million lb a year. At the Dixie Highway and Willamont Rd. plant, a new wing will be built to house new large diecasting machines capable of handling aluminum castings weighing up to 30 lb. Other casting machines will be added in existing space to produce automobile grilles and moldings, large automatic transmission housings and other parts (sizes: Aluminum up to 20 lb; zinc up to 50 lb). Capacity at this plant will be increased by approximately 10 million lb of aluminum annually. Supporting equipment will be added.

100 Per Cent — Doehler-Jarvis' Grand Rapids, Mich., operation will add almost 100 per cent to its diecasting capacity with the installation of modern diecasting machines in new building space. Zinc use in this plant will be increased by about 15 million lb. Operations will be extended to color-anodized aluminum stampings and forgings and assembled products for the automotive and appliance industries.

Barber Die Casting Co. Ltd., Hamilton, Ont., subsidiary of National Lead, will install its first large diecasting machine. Capacity: 20 lb in aluminum, 50 lb in zinc.

Better Supply—A new alloying facility has been built at the Pottstown, Pa., plant No. 2 to permit more efficient metal recovery and utilization and to insure a more efficient supply of molten metal to the diecasting machines. At Pottstown plant No. 1, a new substation (33,000 volts) is being built to cover new demands for power. Capacity of the painting department has been doubled at this plant.

Udylite Gets Ford Plating Job

Udylite Corp., Detroit, received an order from the Ford Motor Co. for one of the world's largest plating installations. The contract calls for complete installation of two of Udylite's automatic, rack-type plating machines to handle bumpers. The equipment will go into the Monroe, Mich., plant of Ford's Parts & Equipment Mfg. Division. One of the 750-ft machines will be ready for operation early next year.

Riding the Trailer Boom

Strick Trailers, Philadelphia division of Fruehauf Trailer Co., Detroit, will build a 200,000-sq-ft manufacturing plant this year. Construction will start this summer. The new plant will employ some 1000 persons. Reason: Says C. Bradford Sheppard, Frick's president: "Our truck-trailer business has more than doubled so far this year compared with 1955."

$20 Million for the Atom

Westinghouse Electric Corp. continues to push ahead in its plans for development in the atomic field. Last year, the corporation set aside and began spending $20 million for development in atomic power equipment.

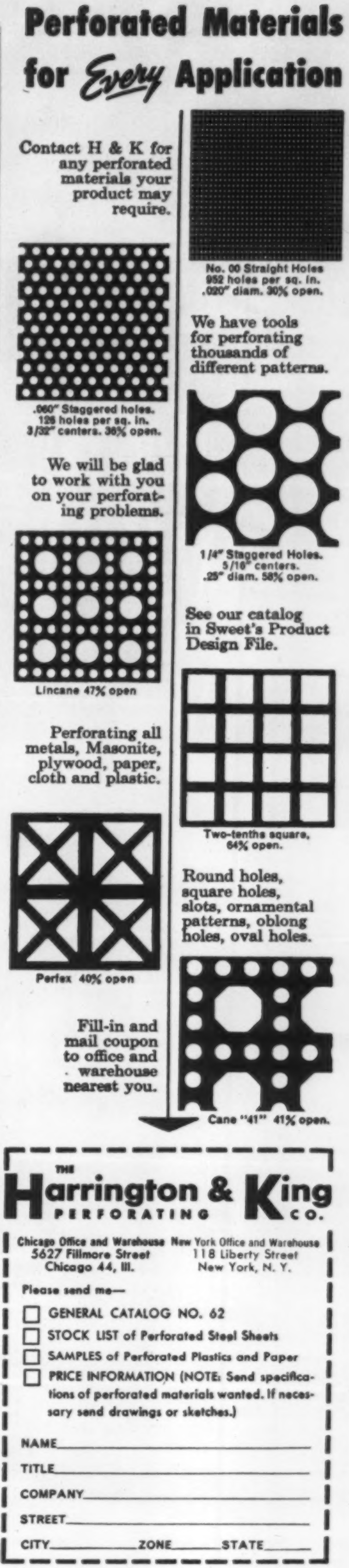
Item: At Bettis, Pa., work on a surface vessel reactor and reactors for fleet-type submarines was stepped up.

Item: Planning for a nuclear core manufacturing plant at Cheswick, Pa., got under way.

Item: Westinghouse and Pennsylvania Power & Light Co., Allentown, Pa., announced plans for a 150,000-kw atomic power plant.

Item: Westinghouse became the

(*Please turn to page* 96)



Perforated Materials for *Every* Application

Contact H & K for any perforated materials your product may require.

No. 00 Straight Holes 952 holes per sq. in. .020" diam. 30% open.

.060" Staggered holes. 126 holes per sq. in. 3/32" centers. 36% open.

We have tools for perforating thousands of different patterns.

We will be glad to work with you on your perforating problems.

1/4" Staggered Holes. 5/16" centers. .25" diam. 58% open.

Lincane 47% open

See our catalog in Sweet's Product Design File.

Perforating all metals, Masonite, plywood, paper, cloth and plastic.

Two-tenths square, 64% open.

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Round holes, square holes, slots, ornamental patterns, oblong holes, oval holes.

Fill-in and mail coupon to office and warehouse nearest you.

Cane "41" 41% open.

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☐ GENERAL CATALOG NO. 62
☐ STOCK LIST of Perforated Steel Sheets
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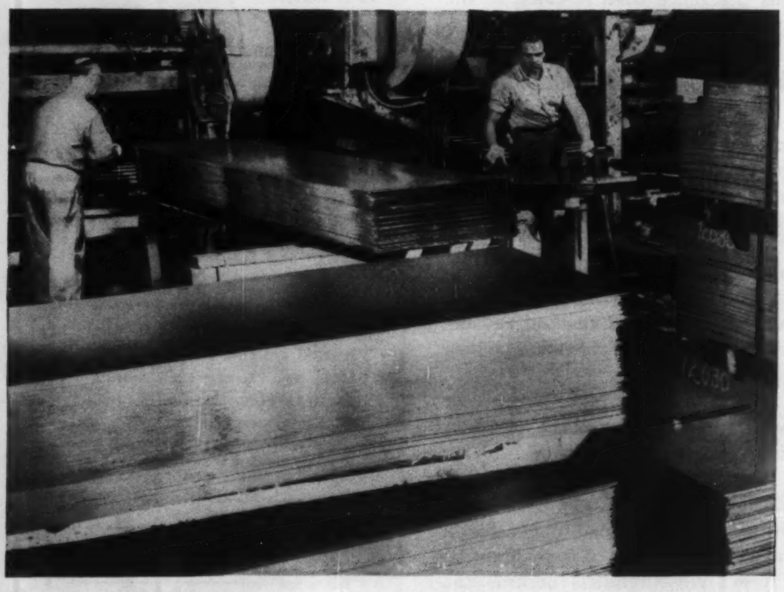
☐ PRICE INFORMATION (NOTE: Send specifications of perforated materials wanted. If necessary send drawings or sketches.)

NAME________________
TITLE________________
COMPANY________________
STREET________________
CITY________ZONE______STATE______

Quality Sheet From Pittsburgh Steel Cuts Cost Of Kitchens



Sheets are sheared for cabinet base floor and cutting board guides.

Helps Build

Long Life, Beauty

And Durability into . . .

Youngstown Kitchens

(Advertisement)

Youngstown Kitchens Division of American Standard is the world's largest producer in its field.

Gleaming Youngstown Kitchens have developed an excellent reputation for quality over the past 25 years. Much of this is due to the steel sheets going into sink, wall and base cabinets turned out at Youngstown Kitchens' big Salem, Ohio, plant.

Like many other major sheet users in the automotive and appliance fields, Youngstown Kitchens has come to depend on quality sheet from modern rolling facilities of Pittsburgh Steel Company. Youngstown demands steel sheet that will meet all requirements for precision in its kitchens. At the same time, the steel must enable Youngstown Kitchens to keep its production costs in line to meet the vigorous competition of the kitchen unit field.

Here are the qualities Pittsburgh Steel's sheet delivers uniformly to help make better Youngstown Kitchens at lower cost:

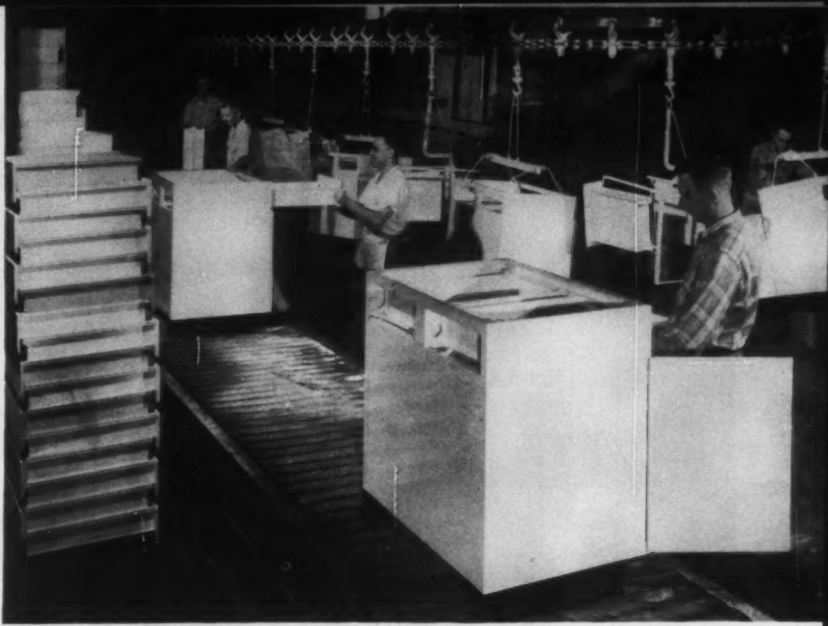
- **Top Notch Internal Quality** is reflected in the sheet's accurate chemical analysis and proper grain structure. Freedom from defects reduces scrap and cuts down the number of inspections necessary. Sinks and cabinets move quicker on the assembly line.

- **Superior Surface** is a characteristic of all Pittsburgh Steel's sheets. A clean, bright and reflective surface on the sheet assures a proper base for enameling. A surface short of the best lets blemishes show through after enamel has been applied.

- **Flatness And Dimensional Uniformity** in the sheet are important to the manufacturer. Pittsburgh sheet makes good on both counts. Absence of waves in sheet makes a trimmer-looking product to catch the eye of the ultimate customer. Youngstown Kitchens can rely on Pittsburgh Steel to provide cold rolled sheet that will not vary in thickness from sheet to sheet or from shipment to shipment.

- **Shapeliness In The Sheet** means it performs well on forming machines, retains its inherent strength while assuming graceful, functional shapes which add beauty to Youngstown Kitchens.

Uniform sheet characteristics like these have built a big demand for Pittsburgh sheet steel. Not every producer can match Pittsburgh sheet's uniformity, so if you require uniform high quality, investigate its advantages today. A phone call to the nearest district office will bring quick results. And your order will get prompt, personal attention from the time it is entered on the books until you receive the shipment.



In final assembly drawers and hardware are added.

Surface cleanliness shows up in bond of sprayed enamel.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

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Los Angeles
New York
Philadelphia
Pittsburgh
Tulsa
Warren, Ohio

(Advertisement)

(Advertisement)

Our Fourth Dimension...

The other day a fact-finder dropped into our office to get some information for a client planning to locate an industry in Massachusetts. Talk got around to availability of highly trained professional people — engineers and the like. Our pool of top-level workers is one of the finest in the country, but reluctantly we had to admit that you don't find too many such folks at liberty.

At that point, our visitor made the interesting observation that his client did not consider this to be a major location problem. He went on to explain that in their experience, engineers, technicians and other high-salaried workers in industry throughout the country are eager to come to New England because it is so fine a region in which to live and work and raise a family.

This *livability* is Massachusetts' fourth dimension in the field of economic development. And there is truly gracious living in this old Commonwealth of ours, rich in its incomparable heritage of American history and culture — its superior educational facilities, its delightful variety as a vacationland, its warm homeliness.

We commend this important element of *livability* in Massachusetts to industrialists with plant location problems.

Richard Preston
Commissioner
Massachusetts Department of Commerce
334 Boylston Street, Boston 16
(COpley 7-5600)

(*Continued from page 93*)

first American company to market an atomic power plant abroad. It's going to Belgium.

Meanwhile, the company will start to build a 20,000-kw atomic plant at Waltz Mill, Pa., this September. The full scale testing reactor will be completed by August, 1957. Estimated cost is $6.5 million.

Bliss To Boost Production

Luria Engineering Co., Bethlehem, Pa., will build a 15,000-sq-ft addition to E. W. Bliss Co.'s rolling mill division plant at Salem, O.

The facilities will be completed in April. They're designed to boost Bliss's production of auxiliary rolling mill equipment and allied machinery.

Springmaker Consolidates

Comfort Spring Corp., Baltimore, maker of springs and spring assemblies for bedding and upholstery, will build a 100,000-sq-ft plant. Facilities at the company's two existing plants will be consolidated at the new works.

More Space for Refractories

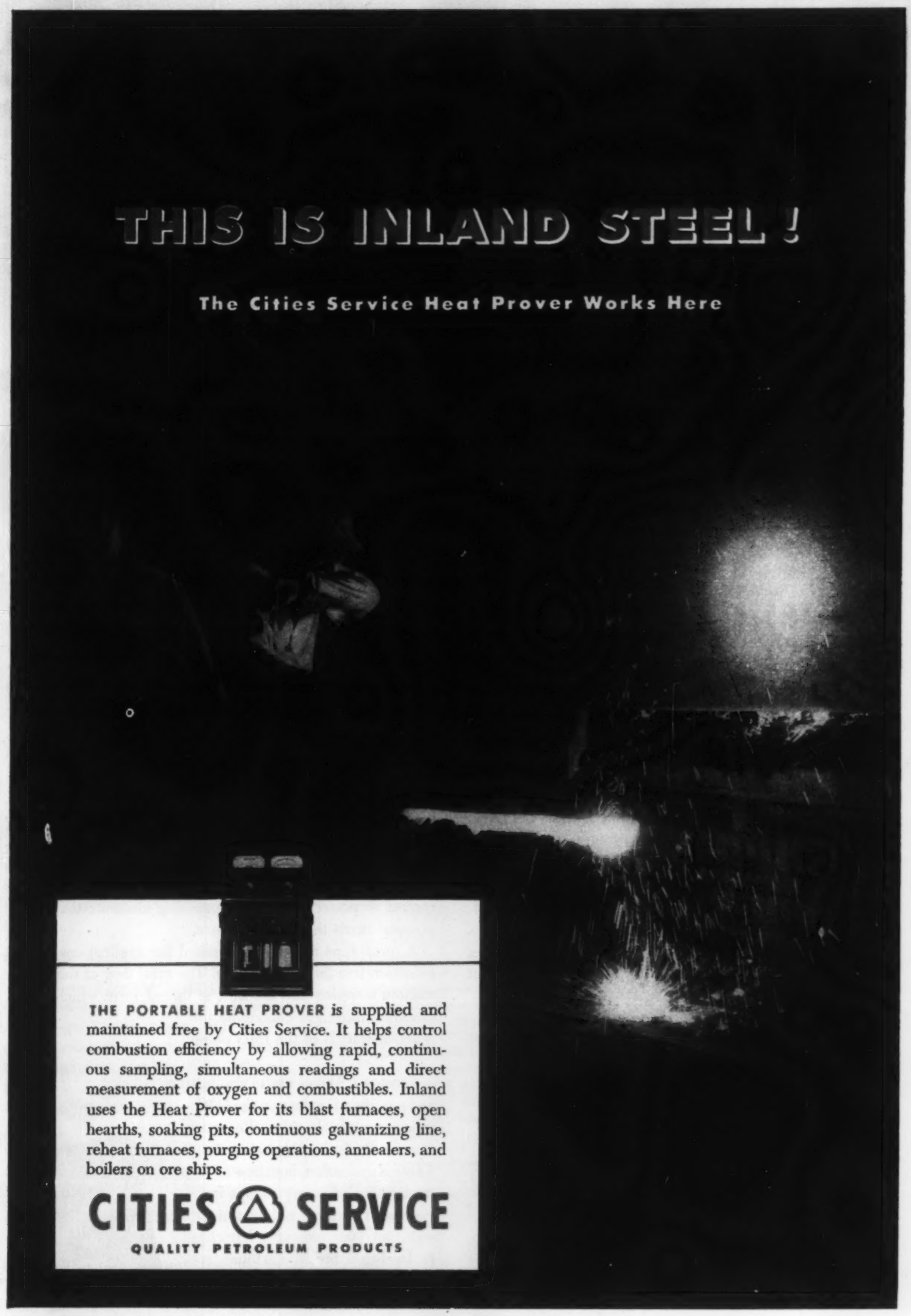
Harbison-Walker Refractories Co., Baltimore, is enlarging its storage facilities. Two additions are being built. One is 16,000 sq ft, the other, 6000 sq ft.

New Plant for Cooler Co.

Baltimore Aircoil Co. Inc., Baltimore, whose 65,000-sq-ft plant was recently destroyed by fire, is starting work on a new plant of about the same size near Dorsey, Md. The company makes evaporative condensers, cooling towers and related equipment.

Production Buys Kuma

Production Tool Corp., Chicago, bought Kuma Tool Co., another Chicago manufacturer of precision tools and equipment. Henry P. Brooks, Production's president, says Kuma will be operated as a division. Present management will be retained.



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The Cities Service Heat Prover Works Here

THE PORTABLE HEAT PROVER is supplied and maintained free by Cities Service. It helps control combustion efficiency by allowing rapid, continuous sampling, simultaneous readings and direct measurement of oxygen and combustibles. Inland uses the Heat Prover for its blast furnaces, open hearths, soaking pits, continuous galvanizing line, reheat furnaces, purging operations, annealers, and boilers on ore ships.

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QUALITY PETROLEUM PRODUCTS

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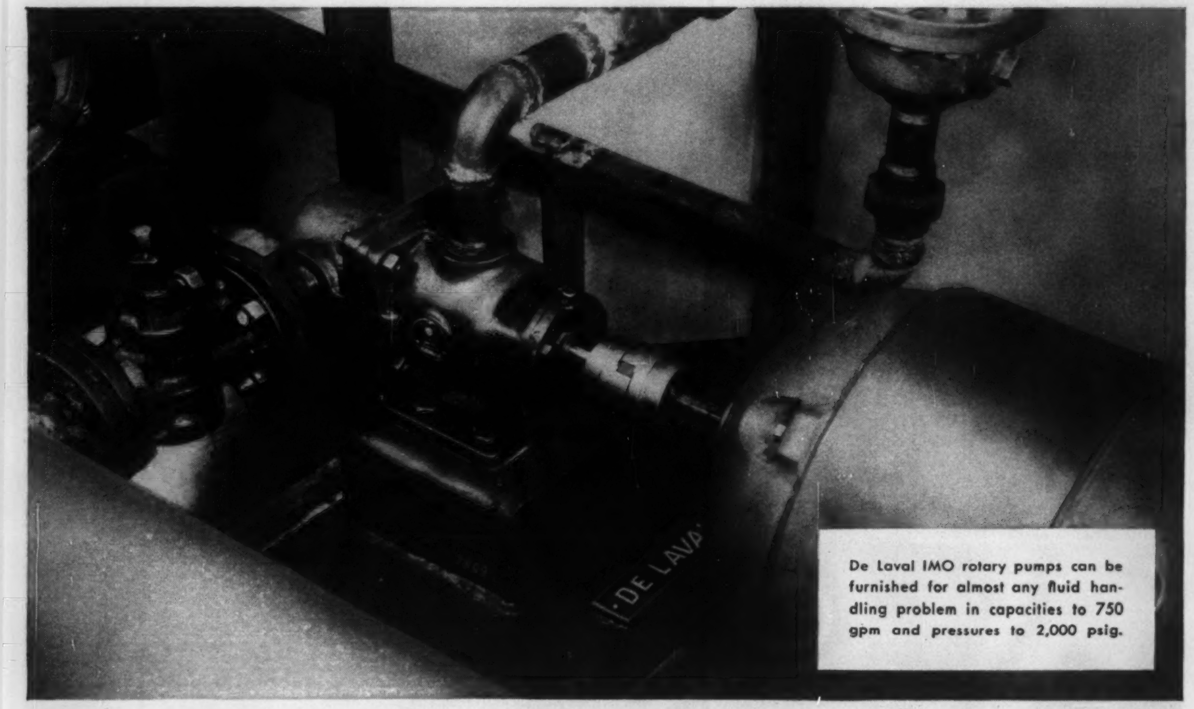


De Laval IMO rotary pumps can be furnished for almost any fluid handling problem in capacities to 750 gpm and pressures to 2,000 psig.

What to Look for in a Rotary Screw Type Pump

By W. J. Mongon, *Assistant Chief Engineer*
De Laval Steam Turbine Company

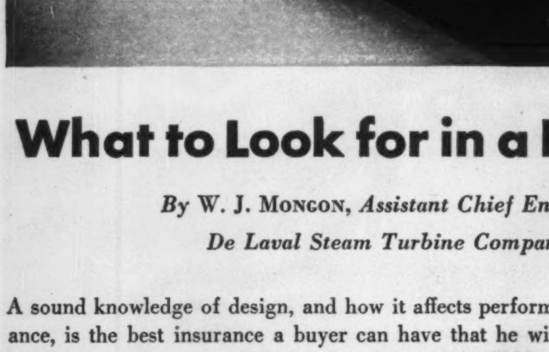
A sound knowledge of design, and how it affects performance, is the best insurance a buyer can have that he will get the pump he needs. This brief analysis of the IMO, a rotary three-screw pump manufactured by the De Laval Steam Turbine Company, will give you some of the necessary facts.

What qualities should you look for in a rotary type pump? It must, of course, meet specified capacities and pressures. But, it must also be efficient, operate quietly, stay on the job.

The axial flow of a screw type pump, and the resulting low inlet losses for any given pump speed, are important benefits that should be considered in making pump selections. The absence of timing gears and other mechanical features of construction also enable the De Laval IMO pump to operate at direct-connected motor and turbine speeds . . . to handle viscous liquids and high suction lifts.

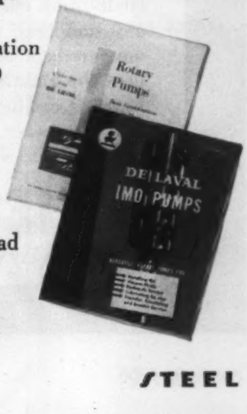
One of the most important features of the IMO pump is the hydraulic turning of the idler or sealing rotors. The central or power rotor is the pumping element; the liquid pumped turns the sealing rotors.

A screw type pump is well suited for applications where pulsation-free flow is desirable. The axial flow of the liquid without trapping and the unique thread form which keeps closures fluid-tight contribute to quiet operation of the IMO pump.



This is a cross-section of the De Laval IMO Series A322A, a positive displacement rotary screw type pump.

Catalog LS gives useful application and specification data on the IMO pump. An article titled, *Rotary Pumps, Basic Considerations in Their Application,* contains a description of rotary pumps in general. For these publications, write on your company letterhead to De Laval Steam Turbine Company, 860 Nottingham Way, Trenton 2, New Jersey. DL-301



Chalmette Grows

Kaiser Aluminum will increase capacity by 27,500 tons with addition of ninth potline

KAISER ALUMINUM & Chemical Corp. is expanding its Chalmette, La., reduction plant's capacity by 27,500 tons to 247,500 tons a year. New facilities are scheduled for operation by the summer of 1957.

Enlargement of the Chalmette plant is in addition to Kaiser Aluminum's other recently announced primary aluminum expansion projects. A reduction plant is going up at Ravenswood, W. Va., and the company is expanding its Tacoma and Mead, Wash., plants. They will get alumina from a new plant to be built at Gramercy, La.

Details—Chalmette will get a ninth potline, consisting of two potroom buildings, each more than 1100 ft long. They will contain 144 electrolytic cells, similar in design and output to those now in operation. Electricity will be supplied by the plant's generating facilities and purchased power. The plant originally was designed to produce 200,000 tons of aluminum annually.

Ferro Gets New Office

Ferro Corp., Cleveland, maker of equipment for porcelain enameling, will build a three-story technical and engineering building. It will contain over 16,000 sq ft of office space. Porcelain enamel walls? Naturally.

Reliance Builds

Reliance Electric & Engineering Co., Cleveland, is getting the second stage of its plant and office development under way. A contract has been let for a 65,000-sq-ft office building, which will be doubled in the future. Reliance's product development, control and electronic equipment facilities already are in operation on the site.

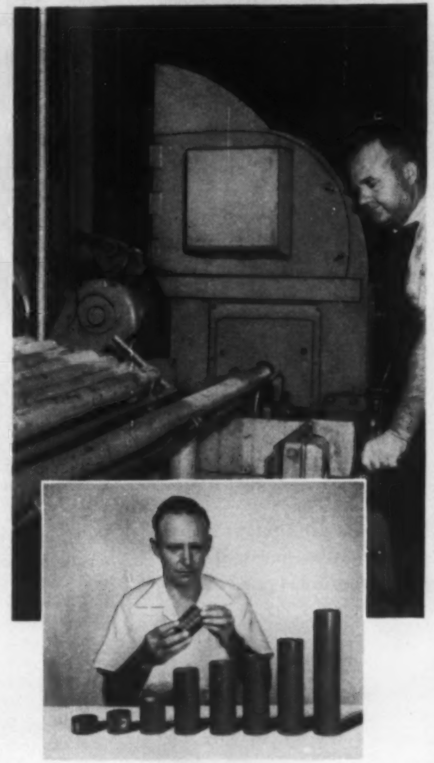
A. E. Hunt Sells Warehouse

SAE Steels Inc., Cleveland and Cincinnati, has bought the warehouse facilities and alloy steel in-

(*Please turn to page* 102)

Abrasive Cutting | *the best way to cut many materials*
the only way to cut some

Campbell Cut-Off Machines



•Cutting 20-foot tubes of stainless steel into 1" to 17" lengths

•Tube lengths cut accurate to .002"

Slice $32,000 a year from tube cutting costs

• Because CAMPBELL Abrasive Cut-Off Machines not only cut stainless steel tubes twice as fast as former methods—but the clean cut saves a deburring process—Ryan Aeronautical Company saved $32,000 the first year of its operation.

Ryan uses thousands of pieces of this stainless steel tubing each month in ball-and-socket joints, nipples and sleeves of exhaust systems. They must be precision-cut from 20-foot pipe in lengths from 1 to 17 inches.

The smooth-finish cut of the CAMPBELL Oscillating Wet Abrasive Cut-Off Machine is accurate within .002"—with no hard spots, no change in metallurgical characteristics. It results from the WET cut with abundant coolant supplied just where it will do the most good. Speed and economy come from the OSCILLATION of the abrasive wheel . . . the right one for the job.

Some additional performance figures

Smooth cutting on CAMPBELL Oscillating Wet Abrasive Cut-Off Machine saves an extra grinding operation on gear tooth samples cut for metallurgical study.

International Nickel's tough K Monel, 4¾" dia., is cut in 2 minutes per cut on a CAMPBELL Oscillating Wet Abrasive Cut-Off Machine.

How to get expert advice on your cutting problems

• CAMPBELL Engineering Service costs you nothing—can save you much. Does your metal cutting problem involve cutting of alloy or high carbon steel? Our Field Engineers are abrasive cutting specialists. They can help you arrive at just the right combination of a CAMPBELL Cut-Off Machine and ALLISON Cutting Wheel that will improve your operation and save you money.

abrasive cutting

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Blast Furnaces and Open Hearths producing pig iron, ingots, blooms, billets and rods.

CF&I Buffalo, New York

Blast Furnaces and Open Hearths producing pig iron, ingots, blooms, billets and rods.

CF&I Claymont, Delaware

Open Hearths producing ingots and steel plate.

CF&I Roebling, New Jersey

Open Hearths producing ingots, blooms, billets, and rods.

CF&I Brooke, Pennsylvania

Blast Furnaces producing basic, Bessemer, foundry, malleable and low phosphorus pig iron.

QUALITY IS AN "EVERY-

CF&I FABRICATING PLANTS

The quality of CF&I steel products is firmly controlled since the requirements of each product determine the analysis of the steel.

CF&I Buffalo, New York

Fine and Specialty Wire of all types including Manufacturer's Wire (Basic, Spheroidized, Annealed, Tempered, Bright and Liquor Finish, Low and High Carbon)—Welded Wire Fabric—Chain Link Fence—Galvanized Strand.

CF&I Claymont, Delaware

Flanged and Dished Heads—Carbon and Alloy Steel Plates—Stainless-Clad Plates—Nickel Lectro-Clad Plates—Manhole Fittings and Covers—Large Diameter Welded Steel Pipe—Flame Cut Steel Plate Shapes.

CF&I Clinton, Mass.

Poultry Netting—Hex Mesh Nettings—Hardware Cloth—Industrial Wire Cloth—Alloy Processing Belts—Perforated Metals—Overhead Conveying Equipment—Sliding Door (Industrial) Hardware.

CF&I Mt. Wolf, Pennsylvania

Insect Wire Screening and Industrial Wire Cloth.

CF&I Oakland, Calif.

Fish and Crab Trap Netting—Stucco Netting—Poultry Netting—Hardware Cloth—Industrial Wire Cloth—Straightened and Cut Wire—Reinforcing Tie Wire—Mechanic's Wire—Chain Link Fence—Crimped Wire.

CF&I Palmer, Mass.

Wire Rope—Wire Rope Slings—Wire, all types (see Buffalo Plant)—Wire Clothesline—TV Guy Wire—Aircraft Control Cable.

CF&I Pueblo, Colo.

Bar, Rod and Structural Products—Grader Blades and Cutting Edges—Rails and Accessories—Chain Link Fence—Woven Wire Fence—Fence Stays—Fence Posts—Corn Cribs—Welded Wire Fabric—Nettings—Grinding Balls and Rods—Screen and Grizzly Bars—Rock Bolts—Galvanized Strand—Clothesline—Barbed Wire—Manufacturer's Wire (Basic, Chain, Spring, Stapling, Weaving, Welding)—Merchant Wire (Annealed and Galvanized)—Nails—Bolts—Nuts—Spikes—Seamless Casing and Tubing.

CF&I Roebling, N. J.

High Carbon Steel Wire (Hard Drawn, Spheroidized and Tempered)—Rope Wire—Tire Bead—Hose Wire—ACSR Core Wire—High Carbon Spring Steel Wire (All grades, tempers and finishes)—Regulator, Sash Balance and Flapper Valve Wire.

CF&I Roebling (Trenton), N. J.

High and Low Carbon Flat Wire (All tempers, edges and finishes)—Brush, Corset, Casing, Heddle and Drop Wire, Umbrella Wire and Tape Lines—Wire Rope—Strand, Aircord and Fittings—Wire Rope Slings—Electrical Wire and Cable and Magnet Wire.

CF&I So. San Francisco, Calif.

Galvanized and Annealed Merchant Wire—Galvanized and Annealed Stone Wire—Bale Ties—Baling Wire—High and Low Carbon Wire—Galvanized and Annealed Wire—Copper Coated Wire—Rope Wire—Welding Wire.

CF&I Worcester, Mass.

Valve and Clutch Springs—Starter Springs—Tire Chain Adjusters—Cross Chain Repair Links—Mechanic's Wire—Compression, Extension and Torsion Springs of all types—Formed Wires.

STEP" OPERATION

at CF&I

THE COLORADO FUEL AND IRON CORPORATION
DENVER • OAKLAND • NEW YORK

There's only one positive way to make sure that steel products will give long-lived, trouble-free service. That's to start with a system of rigid quality controls even before the iron ore goes into the blast furnace—and constantly maintain these controls throughout every stage of production until the product is shipped.

This is the policy at CF&I. Quality control is an "every-step" operation which is part of the job at every CF&I plant.

What's more, CF&I offers you another important advantage—a widely-diversified line of steel products from one source which enables you to get the exact size and type of product that's best for your particular job.

Next time you're in the market for steel or steel products, it'll pay you to contact CF&I.

3490

COWLES

TRIMMING KNIVES

produce more tonnage per grind

Cowles knives stay on the job longer. They keep mills in continuous production without downtime for knife changes. Manufactured from individually hammered forgings, and heat treated to assure maximum durability, they meet industry's most exacting requirements. Complete range of sizes. **Prompt delivery.** Widely used by all principal producers and processors. Let us quote on your requirements!

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Specializing in the Manufacture of

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Another of the Reasons Behind Brad Foote Quality—

DEBURRING

• Deburring of gears isn't normally included in specs or drawings. And we don't get paid for it. But here at BRAD FOOTE we take pains and expend many man hours on deburring—for we know that one tiny burr can ruin a $100,000 machine.

• Examine your next shipment of gears. See whether your present supplier is painstakingly removing all the burrs. Find out how many hours your assembly department has had to charge against deburring. See another way in which BRAD FOOTE quality and extra attention to details saves you money.

• Prove to yourself the savings that BRAD FOOTE quality can mean. Let us quote on the gear requirements for your next program—whether it be radar equipment, diesel engines, etc. BRAD FOOTE has experience in providing gears for almost every specialized application and would welcome the opportunity of discussing your gear problems.

BRAD FOOTE MAKES ALL TYPES OF GEARS—
IN A COMPLETE RANGE OF STYLES AND SIZES

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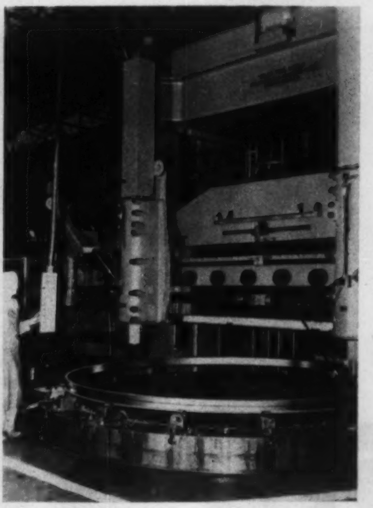
(Continued from page 99)



New Mill at B-L-H

This 14-ft Niles heavy boring and turning mill makes it possible for Standard Steel Division of Baldwin-Lima-Hamilton Corp. to finish machine rings 2 ft larger in diameter than could be handled previously. The workpiece on the 14-ft table above is a 12-ft roll-forged steel ring

---

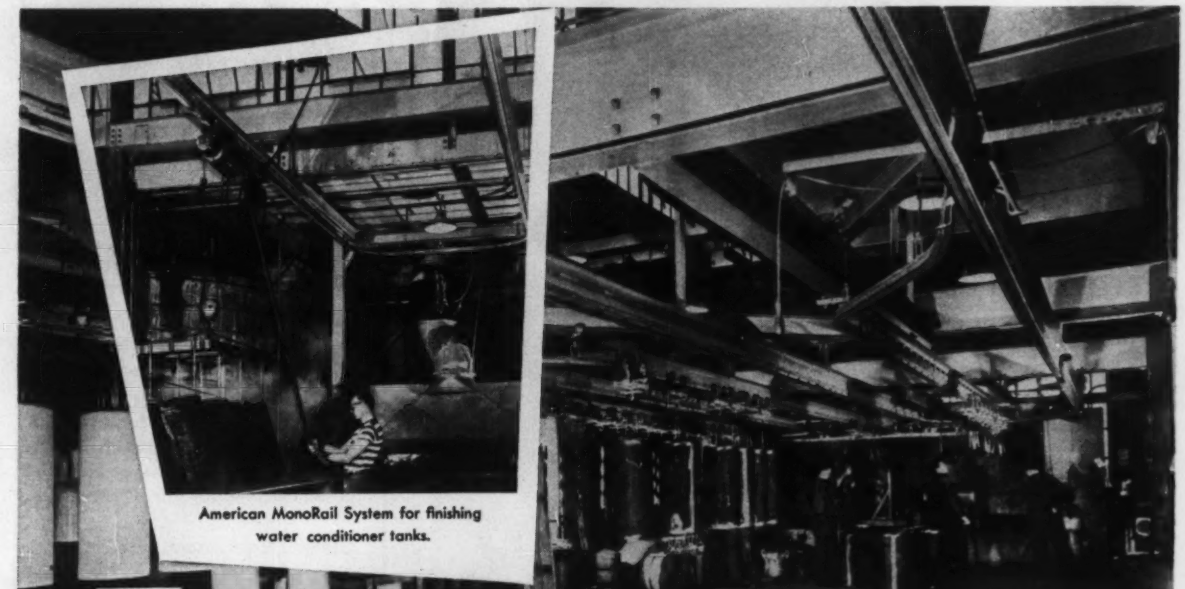
ventories of A. E. Hunt Steel Co., Boston. The new facilities will be operated as the A. E. Hunt Division of SAE, with offices at 80 Boylston St., Boston 16, Mass. The Hunt organization will continue as the New England sales representative of the Steel & Tube Division of Timken Roller Bearing Co., Canton, O.

Mack Renames Subsidiary

White Industries, Plainfield, N. J., subsidiary of Mack Trucks Inc., is now known as the Mack Electronics Division Inc. White Industries was acquired in 1955. Its main offices and production facilities are adjacent to the Mack plant in Plainfield. Robert Edwards will continue as general manager of the newly named division which manufactures gunfire control, radar, missile-tracking and laboratory test equipment.

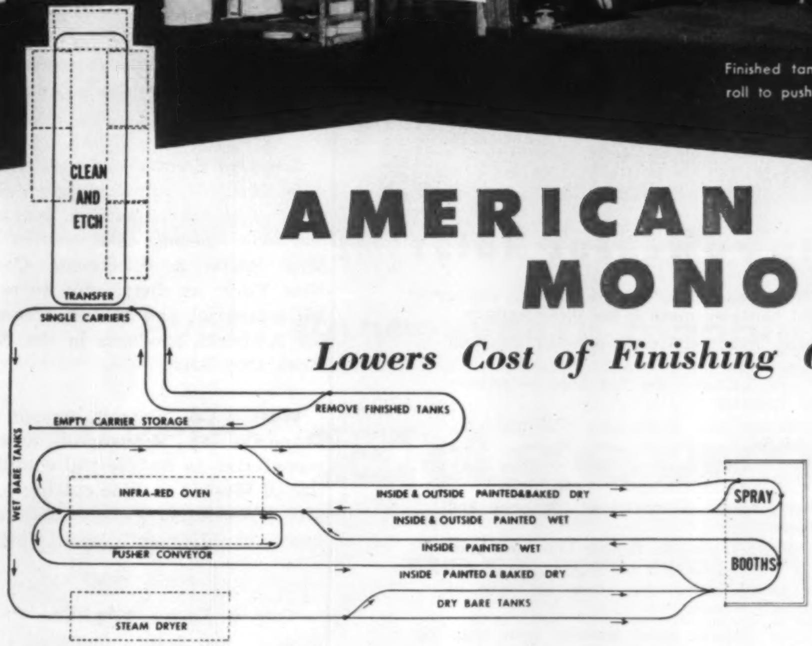
ANNIVERSARIES

Elwell-Parker Electric Co., Cleveland, is celebrating its 50th anniversary of industrial truck production. The firm originally was en-



American MonoRail System for finishing water conditioner tanks.

Finished tanks from spray booth (rear) roll to pusher conveyor in foreground.


CLEAN AND ETCH
TRANSFER
SINGLE CARRIERS
REMOVE FINISHED TANKS
EMPTY CARRIER STORAGE
WET BARE TANKS
INFRA-RED OVEN
PUSHER CONVEYOR
INSIDE & OUTSIDE PAINTED&BAKED DRY
INSIDE & OUTSIDE PAINTED WET
INSIDE PAINTED WET
INSIDE PAINTED & BAKED DRY
DRY BARE TANKS
STEAM DRYER
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Lowers Cost of Finishing Operation

Costs are cut every step from cleaning and etching to finished tanks in this continuous operation by American MonoRail. For this manufacturer the up-and-over system of materials handling boosted production, improved space utilization, cut damages to material and improved both working conditions and production control.

If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you solve it.

up and over

"Up-and-Over" is the title of our 16-mm. sound film to solve many tough handling problems at low cost. Please allow three weeks to schedule showing.

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PLAY IT SAFE

INSTALL THIS POWERFUL HOIST

When we say the Series "700" 'Load Lifter' Electric Hoist is engineered to safeguard man, load and hoist, we mean it has these features:

Two powerful, fast-acting brakes, either one of which can hold the capacity load.

Only 24 volts at the push button — the first hoist to provide this protection for the operator.

Steel suspension to eliminate any weaknesses that might develop into structural failure.

Splined connections that provide the best, most positive holding power.

Upper safety stop that prevents overtravel of the hook and consequent hoist damage.

Wire rope to give the strongest possible flexible line from hoist to lower block.

Non-fracturing, overcapacity hooks that warn on sight of trouble created by severe overload.

The Series "700" 'Load Lifter' Electric Hoist provides more than tops in safety. A ton can be lifted a foot in only 2 seconds. You can inspect and service the hoist *in the air*. In every way, you get quality that saves money. But more — all types of suspension are available, including an efficient motorized trolley. You have a choice of single or two-speed control. Capacities: up to 15 tons. *Get full details from your "Shaw-Box" Distributor or write us for Bulletin 410.*

'Load Lifter'® ELECTRIC HOISTS

MAXWELL MANNING & MOORE INC. TRADE MARK

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

gaged in the design and manufacture of electric motors and generators for overhead cranes and electric automobiles. Elwell-Parker has 500 employees and maintains sales representatives in every state and 30 foreign countries.

REPRESENTATIVES

Inductotherm Corp., Delanco, N. J., producer of induction heating metal melting equipment, appointed Gordon Sondraker & Co., Los Angeles, and Foundry Supply Co. Inc., San Francisco, as its sales representatives on the West Coast.

Clark Equipment Co., Battle Creek, Mich., appointed Francis & Sims Inc., Denver, to sell and service fork-lift trucks, powered hand trucks and straddle carriers produced by the company's Industrial Truck Division.

Amperex Electronic Corp., Hicksville, N. Y., manufacturer of electron tubes for industrial, commercial and special uses, contracted Milo Radio & Electronic Corp., New York, as distributor to service industrial and jobber accounts for Amperex products in the New York City area.

Wesson Co., Detroit, named the Stone Co. Inc., Minneapolis, as representative to handle the complete line of Wesson carbide cutting tools and Wessonmetal cemented carbides in Minnesota and western Wisconsin.

Yale & Towne Mfg. Co., Philadelphia, has named Material Handling Systems as representative for sales and service of industrial lift trucks in the Dayton, O., area.

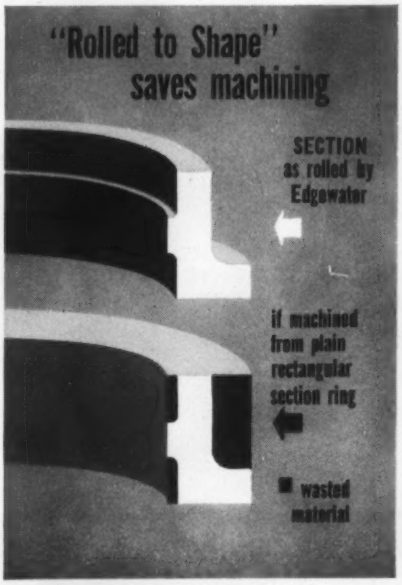
Wyckoff Steel Co., Pittsburgh, manufacturer of cold finished steels, appointed K. O. Brown & Co., Greensboro, N. C., as its southeastern representative in North and South Carolina, Virginia and eastern Tennessee.

Berger Mfg. Division, Republic Steel Corp., Canton, O., granted a steel kitchen franchise to Delph

(*Please turn to page* 109)

Avoid unnecessary machining—

BY USING Edgewater


"Rolled to Shape" saves machining
SECTION as rolled by Edgewater
if machined from plain rectangular section ring
wasted material

ROLLED STEEL RINGS

Rolled accurately to size and shape from solid blocks of steel, Edgewater Rolled Steel rings need a minimum of machining. The saving in time and material can be very substantial, especially when complex cross-section shapes are required. We will be glad to help you make designs that will gain for you the maximum advantages of the Edgewater process. Diameters, 5 inches to 145 inches.

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RINGS

SEND for free bulletin describing the Edgewater rolling of weldless steel rings.

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Direct-Current Motor

KINAMATIC* a new standard in direct-current motors, gives your machines wider speed ranges, greater output

To meet modern industrial needs for faster, more automatic, more continuous production, General Electric has designed an entirely new direct-current motor—the d-c Kinamatic.

Designed for Automation—Now, a direct-current motor has been designed for the modern job it has to do—either as individual motor drive or in regulating systems. The new General Electric d-c Kinamatic motor supplies the wide speed range and versatility required for today's manufacturing methods. It is designed for the close control of machines and split-second timing of processes essential to higher output.

Accelerated Production—The new d-c Kinamatic motor will modernize your equipment, give it increased power, higher speeds, greater output capacity. With the quick-acting G-E Kinamatic motor, your machines will process a greater variety of products . . . faster . . . easier . . . and with less maintenance and spoilage.

More Powerful—By combining advanced design with improved materials and manufacturing techniques, General Electric engineers have packed more power into the entire Kinamatic line. The powerful Kinamatic motor, with new stamina and durability, is ready to become one of your most effective weapons for keeping costs down, for meeting competition, for boosting productivity levels.

Engineering Help—Industrial specialists in 149 conveniently located General Electric Apparatus Sales Offices have the complete story on how the new d-c Kinamatic motors and generators can benefit your operation. For full details, contact your G-E Sales Representative, or write for Bulletin GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.* 813-1

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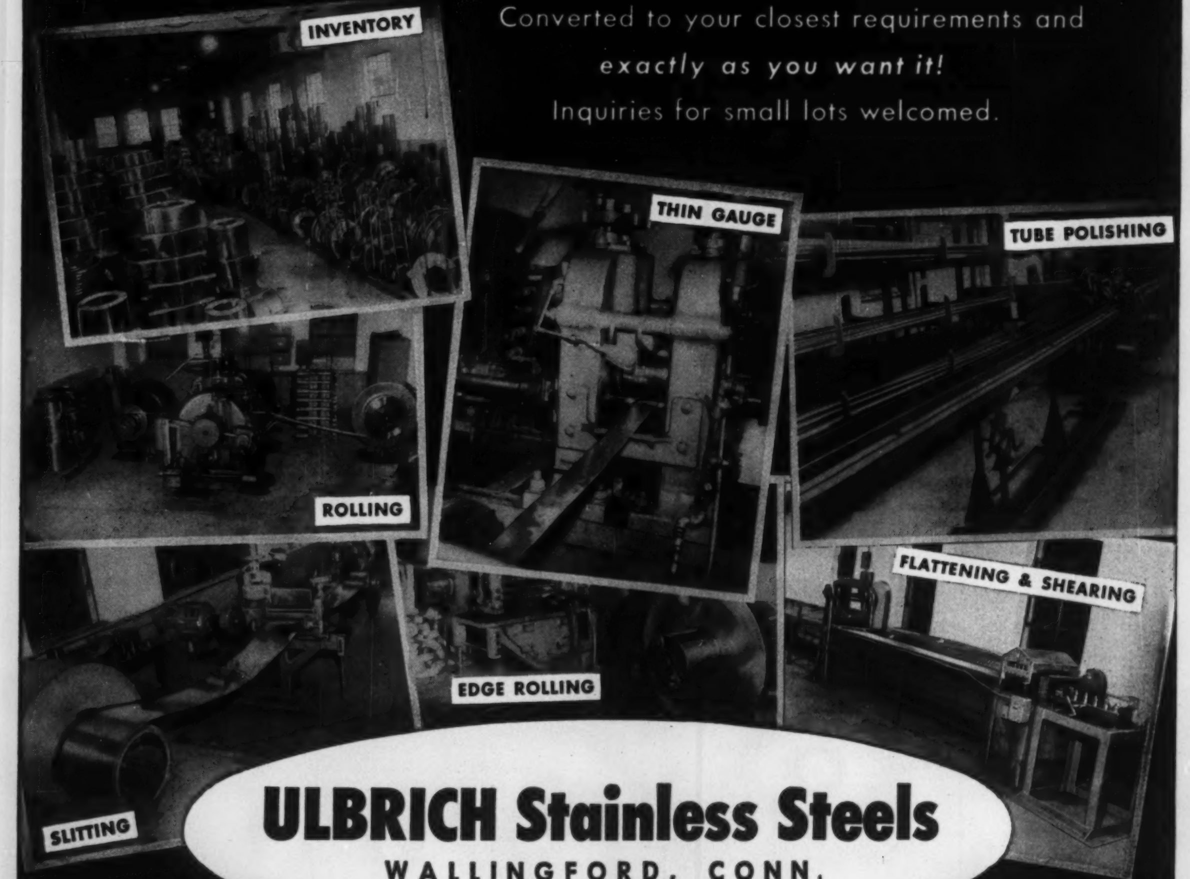
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WALLINGFORD, CONN.

Phone: COlony 9-7771

(*Concluded from page* 104)

Hardware & Supply Co., Charlotte, N. C., to cover the North and South Carolina territory. It also named Warren J. Schafer Supply Co., Miami, Fla., as southern Florida distributor.

Bettinger Corp.'s Toledo Porcelain Enamel Products Co. Division appointed Associated Metal Products, Baltimore, as sales representative in Maryland, Virginia, Delaware and District of Columbia.

Dow Chemical Co., Midland, Mich., appointed Vinson Steel & Aluminum Co., Dallas, as a jobber of magnesium tooling plate in the southwest territory.

NEW ADDRESSES

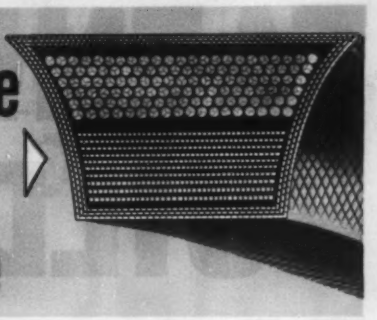
Ferro Cast Corp. will move into new quarters at 2202 Broadway Ave., Santa Monica, Calif., on Apr. 15. They will more than double the company's manufacturing space. The firm manufactures precision investment castings used in aircraft and guided missiles.

Frostrode Division of Warren Alloy transferred its manufacturing machinery to larger quarters at 421 Ferry St., Pontiac, Mich. It has three complete production lines for the construction of cooling units for machine tools, solvent stabilizing in dry cleaning plants and air conditioning in homes.

ASSOCIATIONS

John J. Chyle, director of welding research, A. O. Smith Corp., was elected president of the **American Welding Society.** Other officers are: Clarence P. Sander, Consolidated Western Steel Division, U.S. Steel Co., first vice president; Gustav O. Hoglund, Aluminum Co. of America, second vice president. John H. Blankenbuehler, Hobart Bros. Co., George E. Linnert, Armco Steel Corp., Gordon Parks, Solar Aircraft Co., and Francis H. Stevenson, Aerojet-General Corp., will be directors at large.

Why this curve lengthens V-belt life



THE CONCAVE SIDES (U.S. Patent 1813698) of every Gates V-Belt are a precisely engineered curve. This curve greatly lengthens V-belt life for this interesting reason:

When you bend a Gates V-Belt, just as it is bent around a sheave, the concave sides (Fig. 1) become straight. Therefore, the belt makes full contact with the sheave, gripping the sides evenly (Fig. 1-A) and wear is distributed uniformly across the sidewalls of the belt. Naturally, uniform wear lengthens belt life; saves on replacement costs and cuts down-time.

Now see what happens when you bend a straight-sided belt. (Fig. 2) Just feel the sidewalls *bulge out* at the bend. The bulge causes *uneven* contact with the pulley, as in Fig. 2-A. And uneven contact causes excessive wear at points shown by arrows; belt life is shortened.

Cut costs by getting longer wear from your V-belt drives. Specify Gates Vulco Rope—the V-belt with concave sides. Your nearby Gates distributor will supply your needs promptly. The Gates Rubber Co.—*World's Largest Maker of V-belts.*

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-74

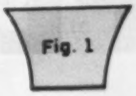


Fig. 1

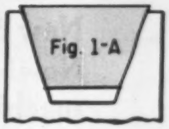


Fig. 1-A

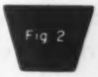


Fig 2

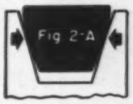
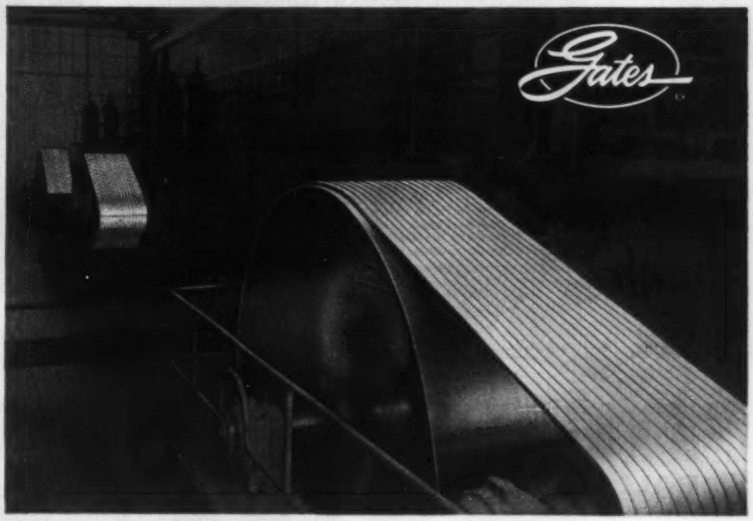
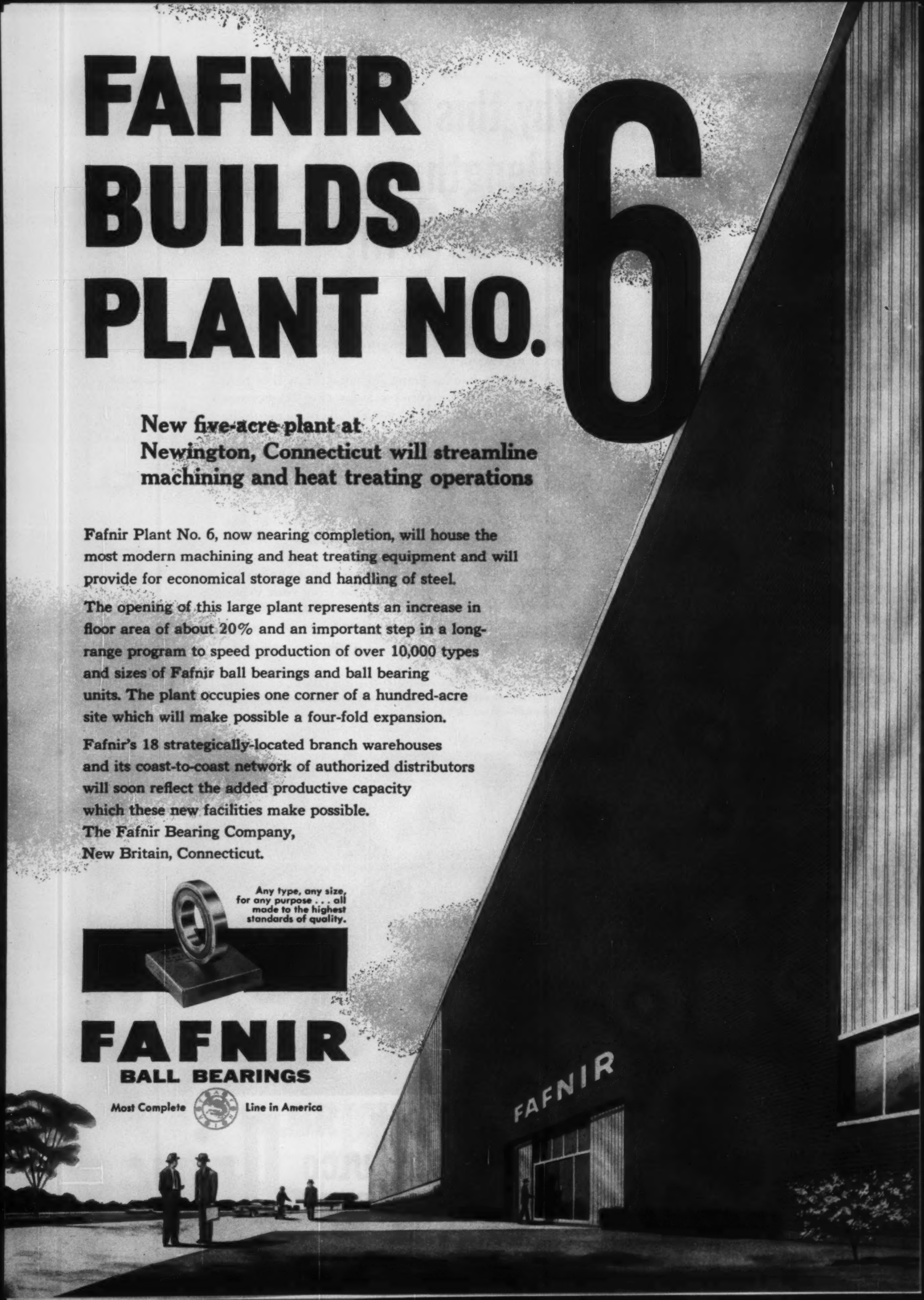


Fig 2-A



Gates Vulco Rope Drives



FAFNIR BUILDS PLANT NO. 6

New five-acre plant at Newington, Connecticut will streamline machining and heat treating operations

Fafnir Plant No. 6, now nearing completion, will house the most modern machining and heat treating equipment and will provide for economical storage and handling of steel.

The opening of this large plant represents an increase in floor area of about 20% and an important step in a long-range program to speed production of over 10,000 types and sizes of Fafnir ball bearings and ball bearing units. The plant occupies one corner of a hundred-acre site which will make possible a four-fold expansion.

Fafnir's 18 strategically-located branch warehouses and its coast-to-coast network of authorized distributors will soon reflect the added productive capacity which these new facilities make possible.
The Fafnir Bearing Company,
New Britain, Connecticut.

Any type, any size, for any purpose . . . all made to the highest standards of quality.

FAFNIR
BALL BEARINGS
Most Complete Line in America

STEEL

April 9, 1956

Technical Outlook

Ti RECTIFIES—You can stop looking for a dry rectifier made from noncritical materials. Titanium oxide is abundant and can be produced in quantity. Fansteel Metallurgical Corp., North Chicago, Ill., says the plates can be stacked, used in the usual way: Series, parallel, half wave, bridge, center tap, etc.

CONTINUOUS ANNEALER—Bethlehem's Sparrows Point, Md., plant is getting four continuous cleaning and annealing lines to handle cold-rolled, mild-carbon steel from 18 to 44-in. wide and from 0.0067 to 0.015-in. thick. Mesta Machine Co., Pittsburgh, will do the job. It expects each line to operate at 900 fpm.

TIN SUBSTITUTE—National Research Corp., Cambridge, Mass., and Crown Cork & Seal Co., Baltimore, have completed negotiations for a long-term research venture. Object: To develop a process to substitute aluminum for tin in making tin plate for food and other containers.

ANTIACID—A manufacturer of molybdenum disulphide lubricants is buffering his product to prevent the formation of free acid which has caused lubrication failure. The buffer does not evaporate or oxidize at 300° F.

M-DIAMOND BOOM—If manmade diamonds become cheaper than the "natural" variety, the industrial diamond business could gross $200 million a year within a decade. That's what J. Stokes Gillespie of GE's Carboloy Department predicted for M-diamonds at ASTE's annual meeting. He explained that diamonds are a strategic material. They do most of the metal cutting on shells, guns, tanks, truck axles, oil well drills, etc. The government continues to stockpile them.

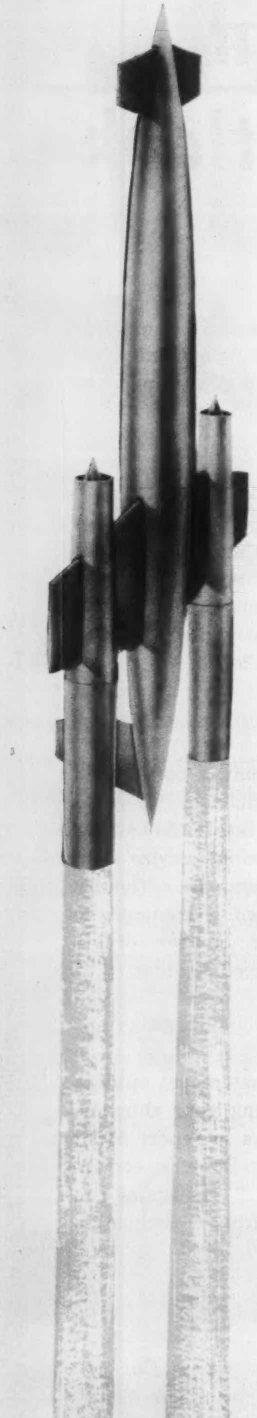
HOTTER JETS—Modern jet aircraft are so fast they're leaving the aluminum and magnesium alloys behind. Armour Research Foundation has been working four years to find metals to beat the heat. It's currently pushing titanium-aluminum-molybdenum alloys.

RIGHT TIGHT—In a rigid joint, a bolt should be torqued as near as possible to its yield strength, so that it will resist a maximum amount of external load without loosening, advise Russell, Burdsall & Ward engineers. In a flexible joint, the bolt should be torqued just enough to prevent leakage, leaving the balance of its strength to take care of external loading.

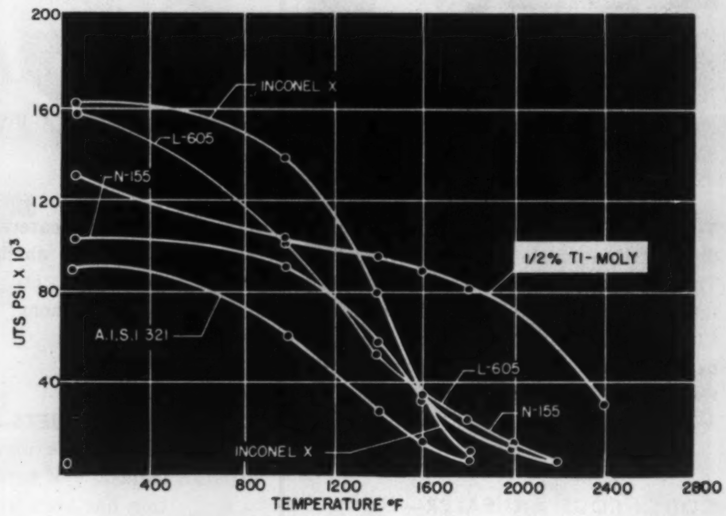
SMOKESCOPE—An optical instrument outdoes the old smoke chart in checking your chimney. The U.S. Bureau of Mines says in report 5162: "The Smokescope . . . may impress certain courts to a greater degree . . ." Industries can use it to check oil or coal furnace combustion efficiency, too.

PEACEFUL ATOM—Ford Instrument Co., (division of Sperry Rand Corp.), wants to install this country's first nuclear power in a 38,000-ton supertanker, which is 700 ft long. The proposed system uses a closed-cycle, gas-cooled power reactor. Installation would be under the Atomic Energy Commission's Power Demonstration program.

Metalworking Outlook—p. 59 *Market Outlook—p. 161*



Ultimate Tensile Strength Vs. Temperature



A comparison of strength vs. temperature. Note the superiority of the titanium alloy of molybdenum

Taming Supersonic Heat

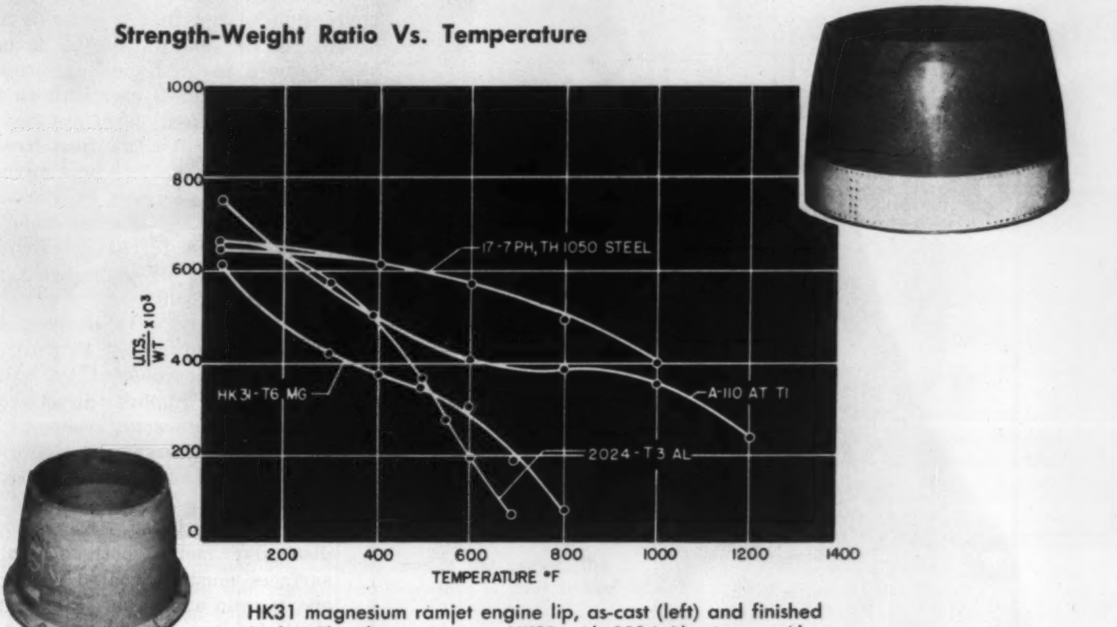
This article is based on a report by A. V. Levy, Marquardt Aircraft Co., Van Nuys, Calif., before the 25th anniversary meeting of the American Rocket Society. Mr. Levy is no stranger to readers of STEEL. He is the author of "Where Heat Is King" (Jan. 31, 1955, p. 86).

THE NEED was never greater for better materials that will stand the gaff in supersonic missiles. With all eyes on the artificial satellite and the intercontinental ballistic missile, designers say that our national progress rests heavily on the materials laboratories.

So far, they are keeping abreast of the demand with these: A titanium alloy of molybdenum; refractory and oxidation resistant coatings; thorium-zirconium alloys of magnesium; titanium alloys; and a surprise: Reinforced plastics.

Barriers To Push—A year ago, the thermal barrier was 1650°F; today, pure molybdenum, alloyed with 0.5 per cent titanium, is still strong at 2000°F. It's good enough to prompt one authority, Alan Levy of Marquardt Aircraft Co., Van Nuys, Calif., to say: "This field of materials shows the greatest promise for true high temperature operation. . ."

If you're thinking of helping to push back the heat barrier and of getting into the rocket and supersonic missile business, here are some facts about the newer



HK31 magnesium ramjet engine lip, as-cast (left) and finished (right). The chart compares HK31 with 2024 Aluminum. Also shown is the curve for A-110 AT titanium

In spite of increased interest in guided missiles and supersonic aircraft, progress still depends on the materials lab. Here's what they offer designers and the prospective manufacturer of supersonic equipment

materials you'll be working with.

Molybdenum Alloys—The earliest molybdenum had to be used as a powder to form parts. Such material has limitations — it's porous, for instance, a quality that doesn't work in ramjets and turbines. They need tight joints and walls.

Climax Molybdenum Co., New York City, is casting and rolling ingots of a titanium alloy of molybdenum in quantity. The first jet engines with all-alloy molybdenum turbine buckets are undergoing tests.

To get such materials, engineers had to solve tough problems: Molybdenum's transition temperature must be below room temperature; welds had to be as ductile as the base metal; raw ingots had to be free from inclusions that would produce surface laminations when formed or rolled; the surface must be well protected against oxidation.

Climax reports that its alloy machines well but is rough on tools, even those made with high speed steels. Shearing must be done at 400 to 600°F to avoid severe edge cracking. Fusion arc welding in an argon gas envelope produces good welds in 0.063-in. sheet — the secret is high welding speed, low heat input and minimum clamping pressure on the chill blocks.

Coatings — Unprotected at high temperatures, molybdenum sublimes (vaporizes) faster than you can snap your fingers. Second in importance only to the base metal itself are the oxidation resistant coatings. They must be economical and free from pinholes, must resist air abrasion and high thermal shock loads, withstand 2500°F and cover the edges of the sheet.

Most promising developments are an aluminum-chrome-silicon spray coating and a chrome-nickel electroplating developed by the Bureau of Standards.

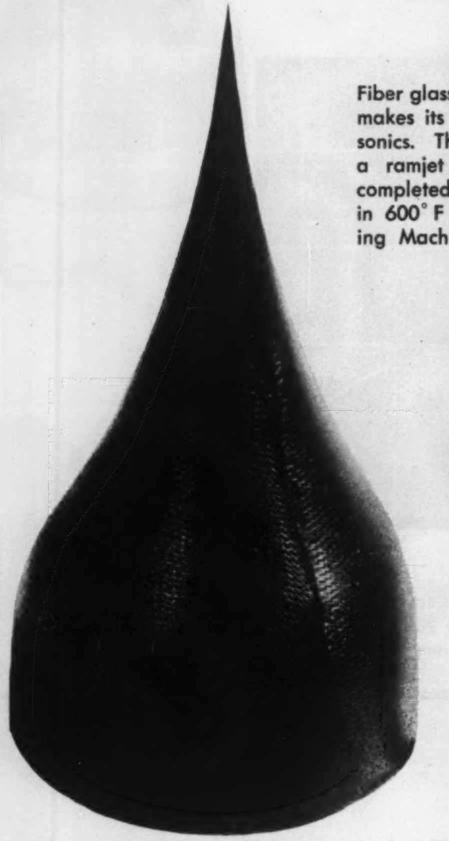
Refractories — Ceramic coatings do three things: Prevent oxidation, insulate and prevent carbon pickup. Until recently, only oxidation and carbon pickup were important.

The Norton Co., Worcester, Mass., has flame-sprayed coatings that do all three: Rokides A and Z. Both work well in thicknesses up to 0.050-in. When sample cylinders with a 0.050-in. coat of Rokide A are heated rapidly to 2600°F, the cermet produces a drop of 300°F. Since Rokide A is also a lightweight material, designers are giving it a lot of attention.

Rokide Z is about twice as refractory as Rokide A. It requires additional production work before it is commercially available in large quantities.

Reinforced Plastics—Many surface, or skin, applications in rockets and missiles only need to resist 500 to 600°F. Reinforced plastic

A Newcomer in Supersonics



Fiber glass reinforced plastic makes its debut into supersonics. This nose cone for a ramjet engine has just completed a 20-minute run in 600° F air at a screaming Mach 2.5

Conlon 506

has been developed for such applications.

Fiber glass reinforcing improves the top operating temperatures of phenolics and silicones. In addition to high tensile and flexural strength, reinforced plastics have high impact strength, low density, low thermal conductivity, good fatigue strength and damping qualities. Don't forget: It doesn't cost much to mold complicated shapes.

One of the severest exterior service tests is the nose cone for a ramjet engine. Several (like the one in the illustration) were molded in an anodized aluminum die. No. 181 fiber glass was used for the reinforcement; two were made with phenolics, two with silicones and one each with an epoxy-phenolic and a polyester resin. All the cones were about ¼-in. thick. Some were plated with chrome or an organic resilient coating for comparison with those left bare.

In a 20-minute test, all the cones showed excellent resistance to air traveling at Mach 2.5 which had been preheated to 600°F. Coatings peeled off, but the plastic bases (including those left bare) were only slightly polished. The silicones showed some signs of plastic flow, but no dimension had changed more than 0.020 in.

HK31 Magnesium — The rare earths—zirconium and thorium—have opened magnesium alloys to the missile designer. Dow Chemical Co.'s HK31 contains 3 per cent thorium, 0.75 per cent zirconium in magnesium. It's weldable, strong at 400 to 700°F, weighs one-fourth as much as steel alloys and comes in sheets, wrought or cast forms.

This alloy works and fabricates about like AZ31 (or FS31) magnesium except that it must be hot formed at 600 to 700°F. It can be sawed, sheared and cold formed. Fusion welding is best with an alternating-current, inert-gas arc.

HK31 qualities as heat treatable in solution. The best method is with a 3 per cent SO_2 atmosphere at 1050° F for 30 minutes, followed by a forced air cooling to 600° F and air cooling to room temperature.

If this alloy is to be used for applications over 600° F, the surface must be protected. A baked epoxy resin applied directly on the bare magnesium seems to be adequate, although an improved method is to provide an HAE anodic coating underneath.

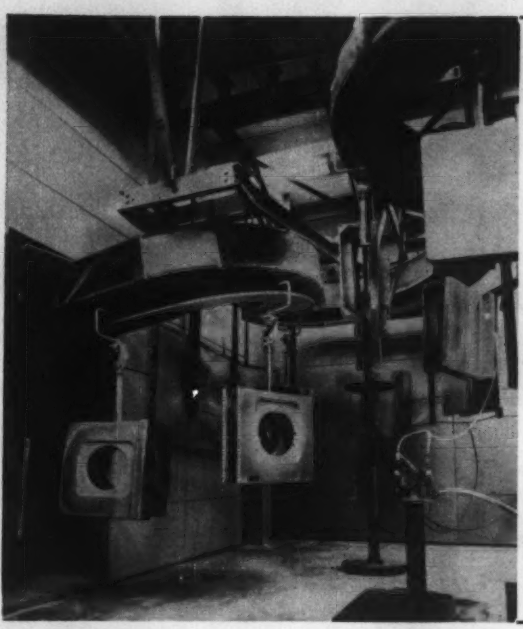
If you are using HK31 with a dissimilar metal, both adjoining surfaces must be coated with the epoxy resin and again sealed after the joint has been made. Any other procedure will produce electrolytic corrosion and failure.

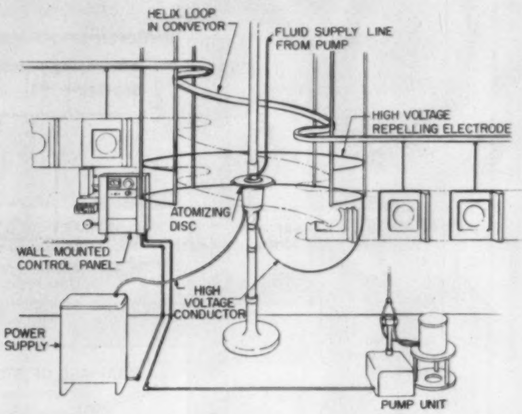
Titanium Alloys — Designers have been waiting patiently for a titanium alloy that combines good strength at 1200° F with reasonable formability and weldability. The two alloys that are available in quantity and that show some promise are: A-110 AT (5 per cent aluminum, 2.5 per cent tin); and a 6 per cent aluminum, 4 per cent vanadium alloy. Both come in wrought shapes and sheet material as thin as 0.020-in.

A-110 AT is an all-alpha alloy that is not heat treatable; the 6 Al-4Va alloy is an alpha-beta type that is heat treatable. In the 600 to 1000° F range, they are stronger than alloy steels. If you are going to weld A-110 AT, the no-rod-metal, inert-gas-arc technique must be used to prevent weld joint contamination. Because it responds to heat treatment, 6Al-4Va needs more research before successful welds are possible.

Evaluation—The labs are continuing to do their part in the supersonic race by finding better materials. They have blazed the trail for companies seeking diversification opportunities.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* Steel, *Penton Bldg., Cleveland 13, O.*




HELIX LOOP IN CONVEYOR
FLUID SUPPLY LINE FROM PUMP
HIGH VOLTAGE REPELLING ELECTRODE
ATOMIZING DISC
WALL MOUNTED CONTROL PANEL
HIGH VOLTAGE CONDUCTOR
POWER SUPPLY
PUMP UNIT

Here's a plan view that shows how the ceramics disc is installed. The parts being coated have been omitted around the disc to show the repelling electrodes which prevent the coating from scattering

As the conveyor winds around the whirling disc in the center, the parts are evenly coated from top to bottom with the slip (coating) that is later baked into the familiar porcelain enamel used on appliances

Porcelain: Put It On Electrostatically

YOU can get a better porcelain enamel finish with the ceramic coating disc. After coating a million sq ft a month for a year, General Electric's Appliance Park, Louisville, reports these results:

1. A gallon of slip coating goes three times farther.
2. Only one operator and three touch-up men are required for each disc.
3. Because of fewer rejects, shop efficiency is almost 90 per cent.
4. Enamel thickness has been reduced from 33 to 23 grams per sq ft.
5. Thinner coatings make it possible to increase re-processings and reduce rejects.
6. Because no exhausting system is used, air makeup and heat loss are reduced.

Production — The developer of the process, Ransburg Electrocoating Corp., Indianapolis, says that the ceramics disc has a wide range of production rates. One disc will coat surfaces up to 30-in. high at a conveyor speed of 20 fpm.

Electrostatic coating with porcelain enamel requires a rotating disc, a conveyor, a pump for the slip and a power supply. The disc is supported from above and below and rotates in a horizontal plane. Slip is fed to the wheel on the top surface near the center. The power pack charges the wheel with 90,000 volts of direct current. The slip tanks are insulated from the high voltage.

As the disc rotates, centrifugal force carries the slip to the edge of the wheel where the electric charge atomizes it. Each particle is electrically charged as it leaves the wheel. Parts being coated are the opposite polarity so that the charged particles are attracted to them. A stationary plastic disc prevents excessive air movement from the edge which might deflect the spray pattern.

Parts to be coated circle the disc once on conveyors. To get complete coverage from top to bottom, conveyors are arranged in a descending spiral.

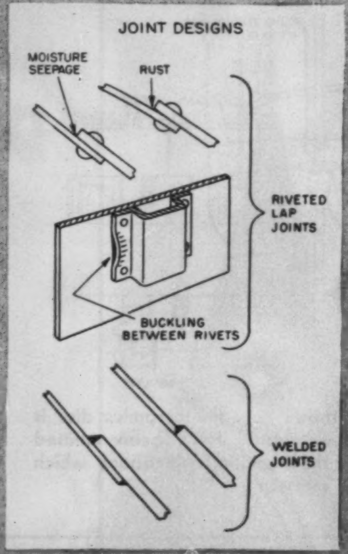
To prevent loss of slip, the conveyor, parts and the disc are surrounded by a charged fence called repelling electrodes. They also are charged with the 90,000 volts used for the disc. Particles that miss the ware being coated are forced back toward the disc. This confines the spray to the looped conveyor area and improves the coverage. Better than 97 per cent of the slip atomized by the wheel reaches the ware being covered.

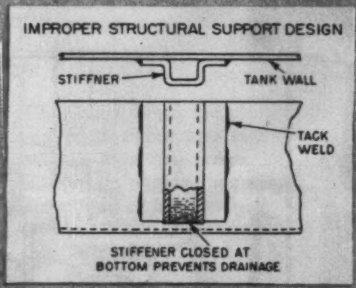
Materials—Slip is ground more finely than usual—less then 0.2 per cent is retained by a 400-mesh screen. A Hegman gage is used to control fineness.

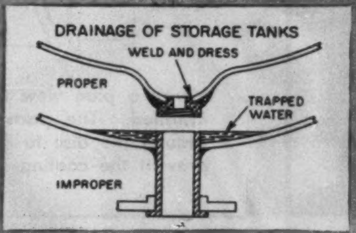
The clay content of the slip should be maintained above 2 per cent. Relative humidity must be controlled to 65 per cent—high humidity produces sags; low humidity may cause orange peel or some form of tearing (separations in the coated surface). Both the slip and the humidity may be varied to compensate for changes in the quality of the coating.

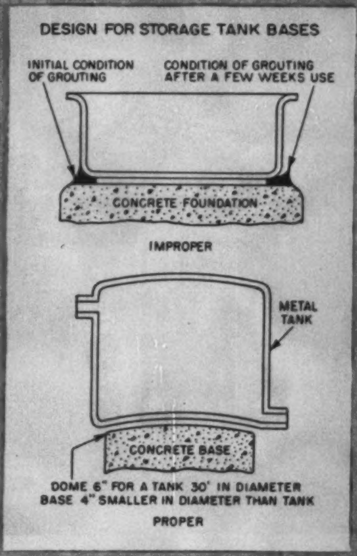
Colors—GE sprays all standard colors (yellow, pink, turquoise, blue and brown) with the same equipment. Variations and skips are corrected by hand brushing before baking.

Another appliance maker plans to install 16 reciprocating ceramics discs to apply both ground and finish coats. Planning and experimental work took about four months.


JOINT DESIGNS
MOISTURE SEEPAGE
RUST
RIVETED LAP JOINTS
BUCKLING BETWEEN RIVETS
WELDED JOINTS


IMPROPER STRUCTURAL SUPPORT DESIGN
STIFFNER
TANK WALL
TACK WELD
STIFFENER CLOSED AT BOTTOM PREVENTS DRAINAGE


DRAINAGE OF STORAGE TANKS
WELD AND DRESS
PROPER
TRAPPED WATER
IMPROPER


DESIGN FOR STORAGE TANK BASES
INITIAL CONDITION OF GROUTING
CONDITION OF GROUTING AFTER A FEW WEEKS USE
CONCRETE FOUNDATION
IMPROPER
METAL TANK
CONCRETE BASE
DOME 6" FOR A TANK 30' IN DIAMETER
BASE 4" SMALLER IN DIAMETER THAN TANK
PROPER

Illustrations after R. B. Mears and R. H. Brown

Build Corrosion Resistance Into

To get the best corrosion mileage with stainless steel, be sure you fabricate it properly. Improper techniques cancel out the metal's prize quality

TOP corrosion resistance of stainless depends not only on the structure and composition of the metal, but on the design and fabrication of the equipment.

Drawings on these two pages illustrate some of the spots where corrosion begins.

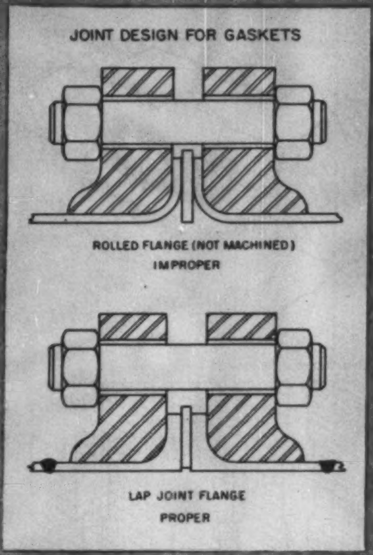
Contamination—During fabrication, surface contamination by zinc or carbon should be avoided, particularly if the part is to be exposed to elevated temperatures. Cracking can occur from embrittlement due to zinc contamination.

If the equipment is to be arc welded, the electrodes should have the same composition as the base metal. If this is not possible, the composition of the deposited metal should be cathodic to the base metal; even if galvanic corrosion should occur, the large anodic area of the base metal, compared with that of the weld, would prevent excessive corrosion.

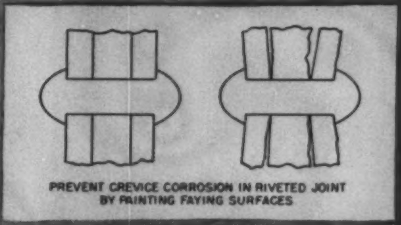
Carburization — During gas welding, a slightly carburizing flame will enhance the fluidity of the molten pool. If, however, the flame is too carburizing, brittleness and a decrease in corrosion resistance of the weld metal will occur.

Fabrication and welding often introduce stresses. If the environment is one that will cause stress-corrosion cracking, the fabricated equipment should be given a stress-relieving treatment at high temperature.

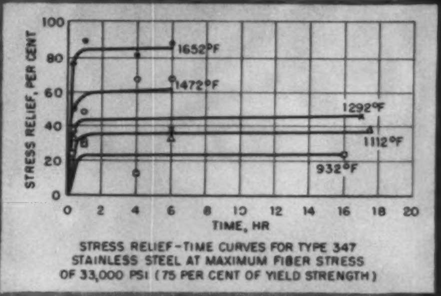
Temperature—In 18-8 Cb, Type 347, for example, the stress-relieving temperature must be above 1600°F if over 80 per cent of the original stress is to be removed. Stress relieved at lower tempera-



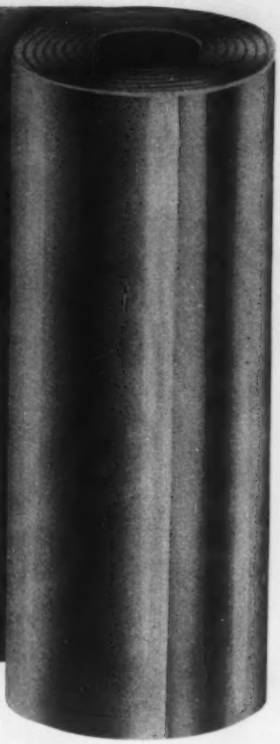
JOINT DESIGN FOR GASKETS



PREVENT CREVICE CORROSION IN RIVETED JOINT BY PAINTING FAYING SURFACES



STRESS RELIEF-TIME CURVES FOR TYPE 347 STAINLESS STEEL AT MAXIMUM FIBER STRESS OF 33,000 PSI (75 PER CENT OF YIELD STRENGTH)



Illustrations after E. V. Kunkel and H. Soff

Stainless

By J. J. HEGER
Chief Research Engineer
U. S. Steel Corp.
Pittsburgh

tures (1470 or 1290°F), the material might still be susceptible to stress corrosion cracking under severe environments.

Moreover, the use of stress-relieving temperatures under 1600°F on welded parts of Types 321 and 347 may cause knife-line corrosion at the weld metal-parent metal interface. (This is a form of intergranular corrosion.)

Design — Although stainless steel is fabricated properly, its utility can be harmed by improper design.

In vessels, adequate drainage should be provided, particularly when periodic washings are desired to avoid product contamination.

Pitting Corrosion — Crevices should always be avoided in stainless steels. They cause oxygen concentration cells which result in pitting-type corrosion. To prevent this, paint the faying surfaces at the lap forming the crevice. Unless these surfaces can be protected by paint, avoid riveted lap joints; use a weld joint instead.

Crevices or other type of moisture traps also can occur on the underside of tanks. A properly designed base, or one where the tank is placed on stilts, will eliminate these undesirable areas.

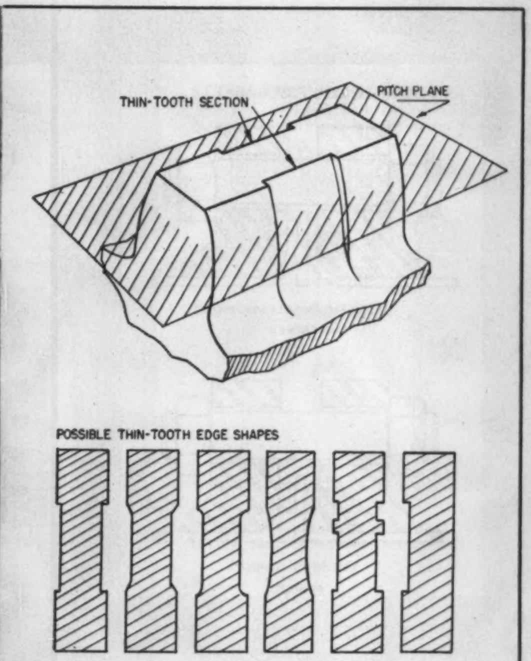
Joints—Gasket-bearing surfaces often become sources of crevice-type corrosion. This is caused by pools of liquid that seep through the gaskets via the fibers. To avoid this, use gasket materials that have no moisture absorbing constituents, or which have continuous exterior surfaces of nonwicking material.

Proper joint design is essential to reducing crevices which permit the corrosion to seep between the gasket and the bearing surface. Crevices may be formed when flanges are not machined. Machining of the flange gives a better fit between the bearing surface and the gasket.

Operation—Controlled operation of well-designed equipment is essential for satisfactory life. Equipment designed and constructed for service under a particular set of conditions should not be used for another set of conditions, unless previous testing or experience shows this change can be made safely.

Overheating should be avoided. This not only increases corrosion rates, but may result in damaging microstructural changes which can only be alleviated by re-heat treating the vessel.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, *Penton Bldg., Cleveland 13, O.*



Axial location of section can be at any selected position along the tooth flank

Being unloaded from the planetary shaver is a spur tooth clutch gear for a truck transmission (specs: 3¾-in. OD, 1-9/16-in. wide, 25 teeth, 7 pitch, 20-degree pressure angle). A ⅜-in.-wide, 0.010-in.-deep section with a sharp step is produced in each tooth flank

Shaving Process Keeps Gears in Mesh

A NEW, HIGH-SPEED planetary shaving process produces uniform, accurate, thin-tooth sections in the flanks of spur gear teeth.

The process was developed by National Broach & Machine Co., Detroit, to meet the needs of transmission builders. When a thin-tooth section is provided in a transmission clutch gear, all tendencies of the transmission to slip out of gear are avoided.

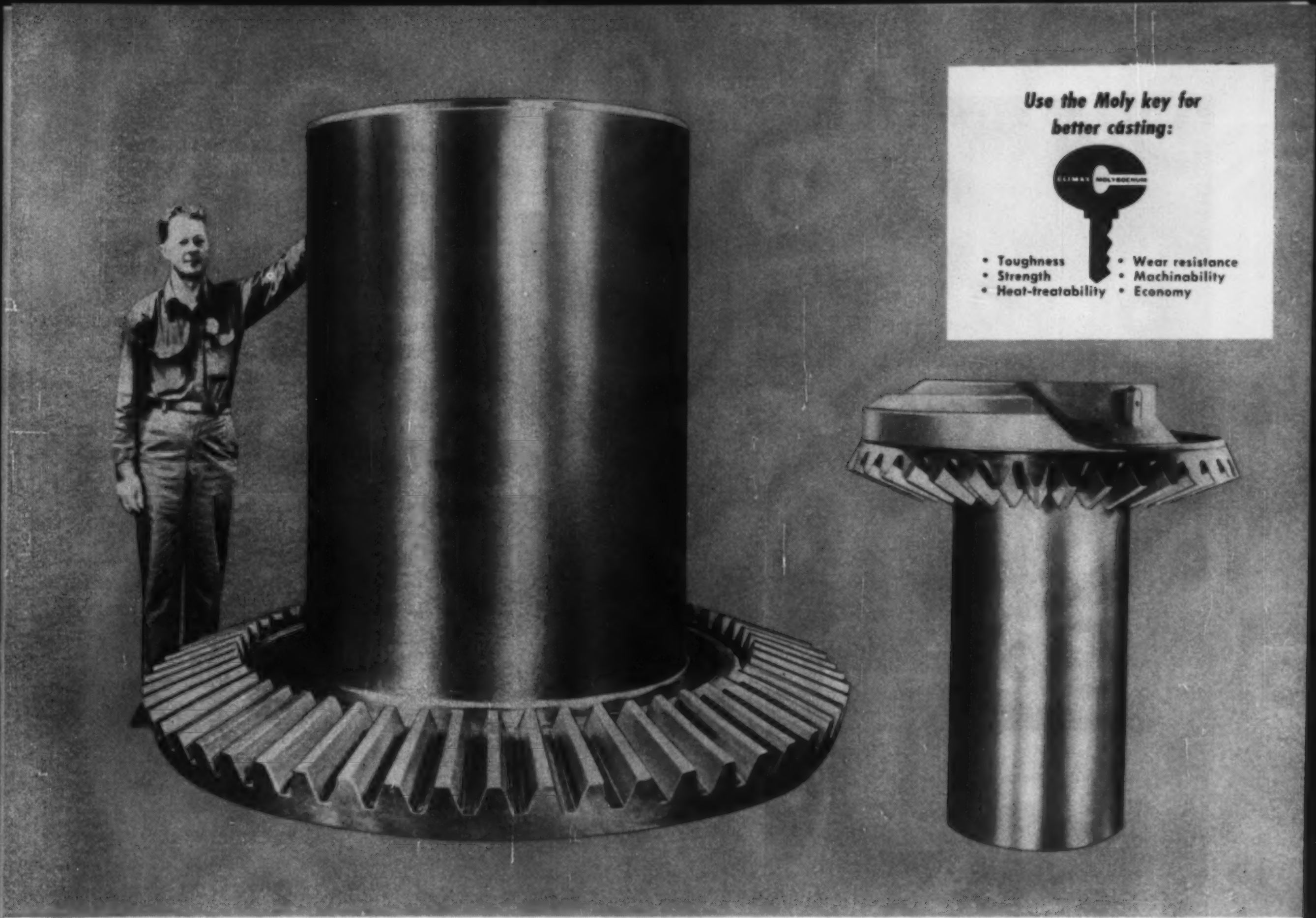
Shapes—A variety of thin-tooth section edge shapes can be produced to suit the requirement for shifting of particular transmissions. The section can be produced in either or both sides of the teeth.

The profile of the section closely approximates an involute form and usually is well within required involute profile tolerances.

How It Works—The planetary shaver has a hardened and ground, high-speed steel cutter that resembles an internal spline. The work gear is mounted in a three-jaw tooth chuck in mesh with the cutter. The work gear rotates around the cutter centerline during the shaving process.

Since the cutter has single cutting edges, which alternately thin first one side of the teeth and then the other, a time relationship is maintained between the gear and the cutter. This is achieved by locating the gear radially in the toothed chuck jaws and rotating the chuck with a master gear and internal gear assembly located in back of the cutter.

At the loading position, the gear is located so that it is in backlash position with respect to each of the cutting edges of the planetary shaving cutter. When the automatic cutting cycle is initiated, the gear axis is rotated and the cutter is fed tangentially in increments, first in one direction, next back to backlash position, then in the opposite direction and finally back to backlash position for unloading.

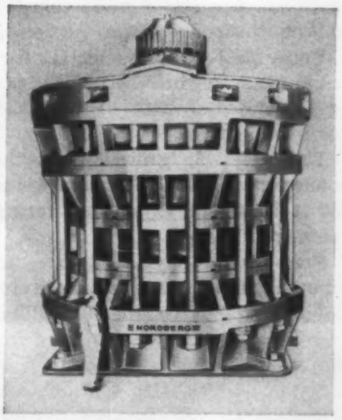

Use the Moly key for
better casting:
CLIMAX MOLYBDENUM
• Toughness
• Strength
• Heat-treatability
• Wear resistance
• Machinability
• Economy

Heavy duty ore crushing machinery is subjected to severe operating conditions. To meet these strenuous requirements the gears shown are made from heat treated low-alloy manganese-*Molybdenum* steel castings. At left: a Symons Gyratory Crusher gear; right: a Symons Cone Crusher gear. Built by Nordberg Mfg. Co.

Cast Manganese Moly Steel contributes strength and toughness to Crushers built by Nordberg

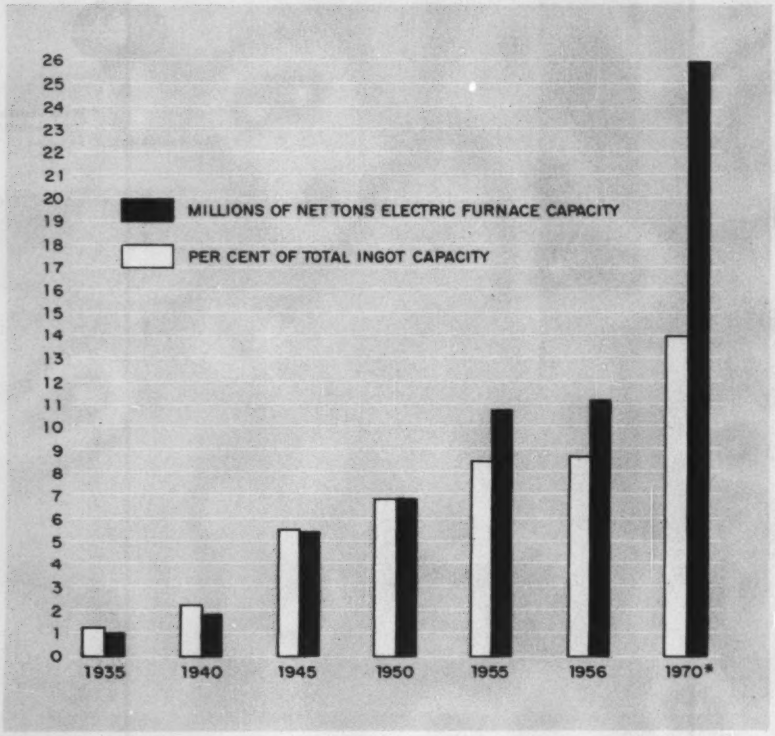
"Where high strength and toughness are prime considerations," says Howard Zoerb, Consulting Engineer of the Nordberg Crusher Division, "molybdenum bearing steels are specified. This is true of the heavy duty parts of Symons® Crushers, built by Nordberg. These steels have contributed to the Nordberg reputation as producers of dependable, heavy duty crushing machinery."

Technical assistance is available to foundries on alloying problems. Please address inquiries on your foundry letterhead to: Climax Molybdenum Company, Department MF3, 500 Fifth Avenue, New York 36, New York.



The Symons Cone Crusher is a product of Nordberg Manufacturing Company.

CLIMAX MOLYBDENUM



*Estimated by STEEL

Rise in furnace capacity shows how . . .

Electrics Move Ahead

TWENTY YEARS ago electric furnace steel capacity was just over the million-ton mark. Today, installed capacity is more than 11 million tons.

From 1935 to 1955 electric furnace capacity increased 925 per cent, compared with 61 per cent for open hearths.

That's sizable growth. And the consensus is that electrics are due for a lot more expansion during the next 20 years.

Predictions—Says Clarence E. Sims, Battelle Memorial Institute, Columbus, O.: "Of the 60 million tons of new capacity projected for the next 15 years, our opinion is that 25 per cent—15 million tons—will be electric furnace capacity."

Comments E. A. Hanff, vice president, Swindell-Dressler Corp., Pittsburgh: "Completed and projected expansion of large electric furnace capacity within the past few months has been remarkable. . . one might conclude that over the next 15 years it may account for 20 to 30 per cent of the projected 60 million tons of new capacity."

Even more optimistic, W. B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, says: "In 1955 well over 2 million tons of electric furnace ingot capacity was contracted for. If this rate is kept up for the next 15 years, obviously 50 per cent of the 60 million tons of new capacity will be electric. . . We feel that any estimate less than an 18-million-ton increase is short."

"Our estimate is that by 1960, electric furnace capacity will increase to 15 million tons," reports F. B. O'Mara, manager, electrode products of National Carbon Co., New York. That's almost a million-ton-a-year increase for the next four years.

Agreement — Steel people and furnace builders alike are prophesying continued rapid growth (see chart left) of the electric furnace method of steelmaking. They say it's a good bet that at least 15 million tons of new electric capacity will be installed by 1970.

On the basis that the projected 60 million tons of new capacity (STEEL, Sept. 5, 1955, p. 41) will raise our total ingot capacity to about 185 million tons by 1970, electric capacity will rise to about 14 per cent of total ingots, compared with about 8.5 per cent now.

Dr. Sims is an author of the much-quoted Battelle report (1953) on comparative economics of open-hearth and electric furnaces for production of low-carbon steel (STEEL, Aug. 24, 1953, p. 84).

It told some steelmakers what they had suspected for a long time: At least in some circumstances, electric furnaces can be cheaper steel producers.

But many factors come into the picture during a big expansion period such as we are in.

Basic Points — In the over-all production, steel is made from a charge consisting of 55 to 65 per cent pig iron and 35 to 45 per cent scrap, but in a period of expansion, there is a chronic shortage of scrap and stiff competition for it.

It means that at least 50 per cent (probably more) of the increased production will have to come from pig iron. This will tend to limit the use of electric furnaces.

But it does not mean that hot metal cannot be used in them. In test runs, as much as 50 per cent hot metal has been used in commercial furnaces.

Experience Needed — In fact, there is no good established hot metal practice for the electric furnace. Shopwork has not been done to develop procedures. One big reason: So little hot metal has been available for this purpose. Certainly, the present hot metal practice which works so well in the open hearth was not developed overnight.

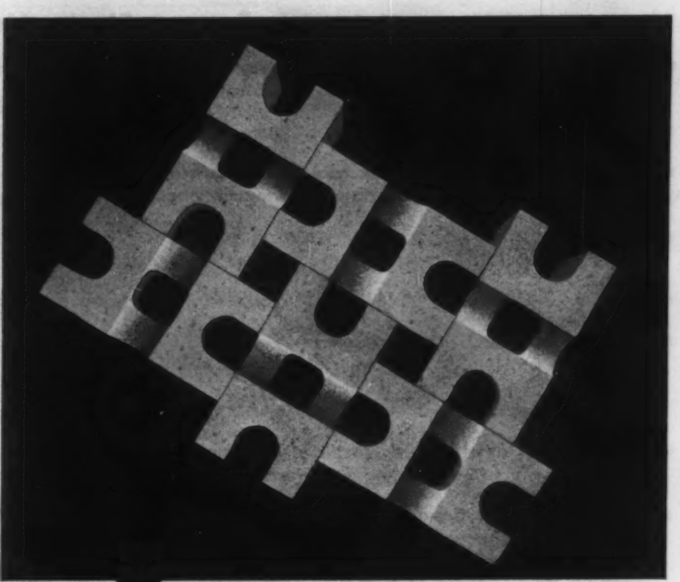
One large producer reports it

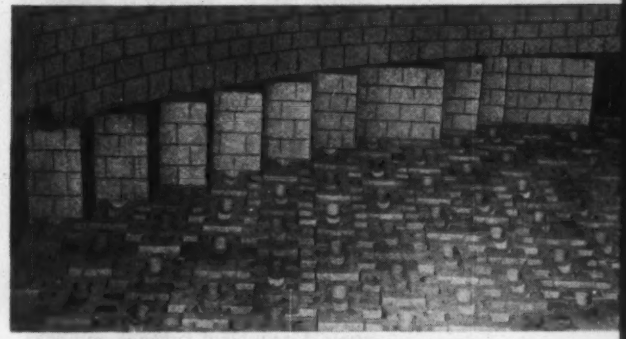
New design provides

25% to 50%

GREATER HEATING SURFACE

than ordinary basket weave checkers



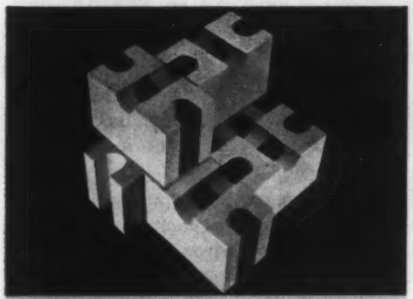


Tendency of checkers to twist in service is overcome by pilaster wall construction of the Bailey Hot Blast Stove.

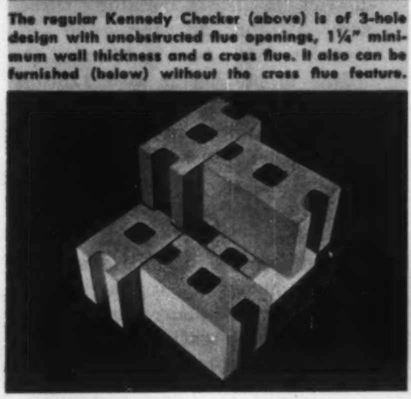
KENNEDY

BLAST FURNACE STOVE

CHECKERS



The regular Kennedy Checker (above) is of 3-hole design with unobstructed flue openings, 1¼" minimum wall thickness and a cross flue. It also can be furnished (below) without the cross flue feature.



This new 3-hole checker shape is laid in basket weave style to produce a solid 1¼″ wall between each flue. This assures greatly increased heating surface without sacrificing the advantages of basket weave design.

The increased heating surface of the Kennedy Checker results in a correspondingly lower stack temperature. This makes possible the use of a modern steel bottom for supporting the checker system.

Write for Bulletin

WILLIAM M. **Bailey** COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD
PITTSBURGH 16, PA

Management Looks at Electric Furnace Steelmaking

- Lower capital cost—better return on investment. Starting from scratch, costs may be 60 per cent of those for equivalent open-hearth capacity
- Permits expansion where available space is tight
- Optimum flexibility—the same furnace can switch from stainless to alloy to special carbon to common carbon to match changing markets
- Runs under either oxidizing or reducing conditions. Gives good recovery of oxidizable alloys, such as chromium or manganese
- Handles the sulphur problem well—avoids trouble from high sulphur fuels
- Tops in on-and-off economy. Can be shut down over a week end or holiday. Start-up takes minimum labor and little preparation, such as soaking. Can be operated on five-day, single shift, or seven-day, two or three shift operation with equal facility
- High thermal efficiency of electric arc is important in view of rising prices of other fuels. Power inputs are greater than ever before, melt time lower
- Improved furnace design gives increased availability of equipment. Older side-charge furnaces required up to an hour to charge—top-charge designs may be charged in a few minutes. Automatic electrode clamps permit slipping of electrodes in a matter of seconds and by one man instead of two. Increased availability means a greater distribution of fixed charges, such as power demand charge, investment, supervision, auxiliary services, etc.
- Temperature can be regulated to high accuracy. Mechanization of controls has made operations faster, more accurate
- Electrics can use most types of scrap
- High quality product is turned out. No matter what is being made, the conditions of temperature, cleanliness, choice of slag, etc., are flexible. This works for a high quality, uniform product—a point bound to become more important to product designers
- Advantages for making alloy and special steels may be reflected in growing market for such products in the years ahead
- Fits into the decentralization picture
- Electrics are a good balancing factor in an integrated mill

has used up to 40 per cent hot metal charges in its electric furnaces on a repetitive basis (with even higher percentages at times) in furnaces of conventional design. Other producers, less successful at hot charging, say that new furnace designs will be needed to make hot charging practical and controllable without pretreatment of the metal.

Build On—Another point affects the all-out purchase of new electrics. Because of the high cost of new facilities, every effort is being made to increase productivity of existing equipment.

Open-hearth shops will tend to increase the size of their furnaces or add another furnace to increase capacity instead of putting in electrics. The only size limitation on open hearths seems to be crane capacity. Restrictions on depth of bath are not so important with the more violent boil obtained when oxygen is used, even though there still are some problems to be worked out with oxygen.

No Question Here—It's doubtful if any open hearths will be built in the future for cold charging, such as in the nonintegrated plant. Here the advantages of the electric furnace are clear cut.

Says C. D. King, assistant to executive vice president of operations, U. S. Steel Corp., Pittsburgh, in his Howe Memorial lecture: "It's questionable, except under most unusual circumstances, that we shall see open-hearth plants built to utilize cold iron and scrap charges. Certainly, this is one area that can be served by the modern electric furnace."

He continues: "In the area of carbon steels, electric furnaces are likely to be considered mainly where large quantities of steel scrap are available on the open market and where power costs are reasonable. In effect, this means nonintegrated plants."

But there also are benefits for the integrated plants. This is emphasized by the recent rush of several large producers to get more electrics under their roofs.

On this point Mr. King reports: "One may visualize their growing use for carbon steels based on scrap charges where a modest increase in ingot production is required at plants using open hearths. It also is probable that the use of some pneumatic process to prerefine the hot metal prior to charging into the electrics will be considered on occasions."

Management of some integrated plants says electrics give fast capacity increases with minimum investment in areas where scrap is available and power costs are moderate. Electrics are a good balancing factor in an integrated mill, according to one steel executive. They also allow expansion in areas where space limitations rule against new blast furnace and coke oven facilities, or where commitment for such heavy expenditures cannot be justified in the long run.

This is the reasoning back of new electrics being purchased by integrated companies like Republic Steel Corp. and Jones & Laughlin Steel Corp.

For example, Republic is picking up added capacity in a hurry by replacing three 70-ton furnaces with 130-ton ones in its Chicago district. It also is installing three new 170-ton furnaces—one in Gadsden, Ala., two in Warren, O.

J&L is putting in two 125-ton electrics at its Cleveland Works to gain extra capacity rapidly with reasonable capital expenditure.

Supplement—C. W. Holmquist, executive vice president, Copperweld Steel Co., Warren, O., has this to say: "Electric furnaces as a supplement to open hearths in a fully integrated plant present quite a desirable potential as a means of consuming revert scrap while the open hearths produce from pig and lower grade scrap items."

Possibilities—A turn of events could open the door wider than ever to electric steelmaking. One area to watch is raw materials for the electric melter—so he will be less dependent on scrap.

Says M. K. Schnurr, president, Rotary Electric Steel Co., Detroit: "So long as the electric melter must obtain 75 per cent of his iron requirements from the scrap market, his position always will be vulnerable from the cost standpoint. . . It tends to restrict him to specialty steels which throw out a substantial profit margin and absorb fluctuating scrap costs."

Here's what Mr. Schnurr says is needed: "It has been apparent for some time that the single important factor in this problem is the necessity to develop an intermediate product from ore in the form of reduced iron as a hedge against the open market cost of carbon steel scrap. From research accomplished to date, such an intermediate product seems perfectly feasible."

Lectromelt's Mr. Wallis sees further developments in the raw materials picture: "High scrap prices are bound to bring about increased use of briquettes—for example, those made of reduced iron ore with about 96 per cent iron. Already, as much as 60 per cent of the charge in some plants is made up of these briquettes."

"Direct reduction of ore by hydrogen is bound to come," says Harry W. McQuaid, consultant, Cleveland.

A-Power — Another point to watch: Power costs. With the rush on to develop electricity from atomic power, cheaper kilowatts may be a big factor in long term expansion of electric-furnace steel.

A. B. Wilder, chief metallurgist, National Tube Division, U. S. Steel Corp., Pittsburgh, told the AIME convention in New York a few weeks ago: "Availability of nuclear energy will provide important developments, particularly in electric steelmaking and utilization of scrap."

With so much effort today going into developing small nuclear package power reactors, it's well within reason that the steel mill of the future may have its own small atomic power plant, wired directly to its substation to feed its electric furnaces.

Still another important gage to future electric steel activity: How will electrics fit in with the new steelmaking technologies? The oxygen converter — the most recent to catch hold—is rapidly forging to the front. Continuous casting is in the picture, but is coming along slower.

Pneumatic Process—"Where an oxygen converter-electric combination is used in an integrated plant," says Battelle's Sims, "it's likely that all the low and medium carbon steels will be made in the converter using maximum pig iron. The electric furnace will produce high carbon or alloy steels using purchased scrap or hot blown metal from the converter."

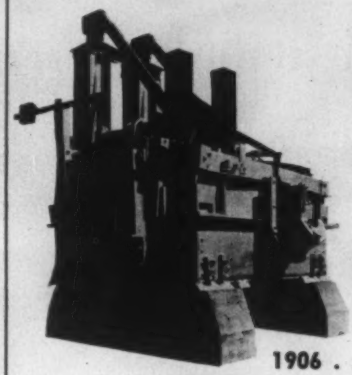
Alternate Facilities — C. W. Holmquist comments on this point: "The oxygen converter plant does not offer an opportunity to consume quantities of scrap although it will consume its own revert. Alternate melting facilities appear desirable and the electric furnace is ideally suited to the operation."

Concerning continuous casting, Mr. Holmquist says that the high periodicity of the electric furnace, compared with the open hearth, may prove to be an important advantage as the art develops. However, not to be overlooked is the fact that the oxygen converter also has high periodicity.

In the future, the electric furnace may gain new significance for carbon steel through the use of prerefined hot metal or metal treated by processes such as desiliconizing.

One steelmaker says that the

50 Years . . .



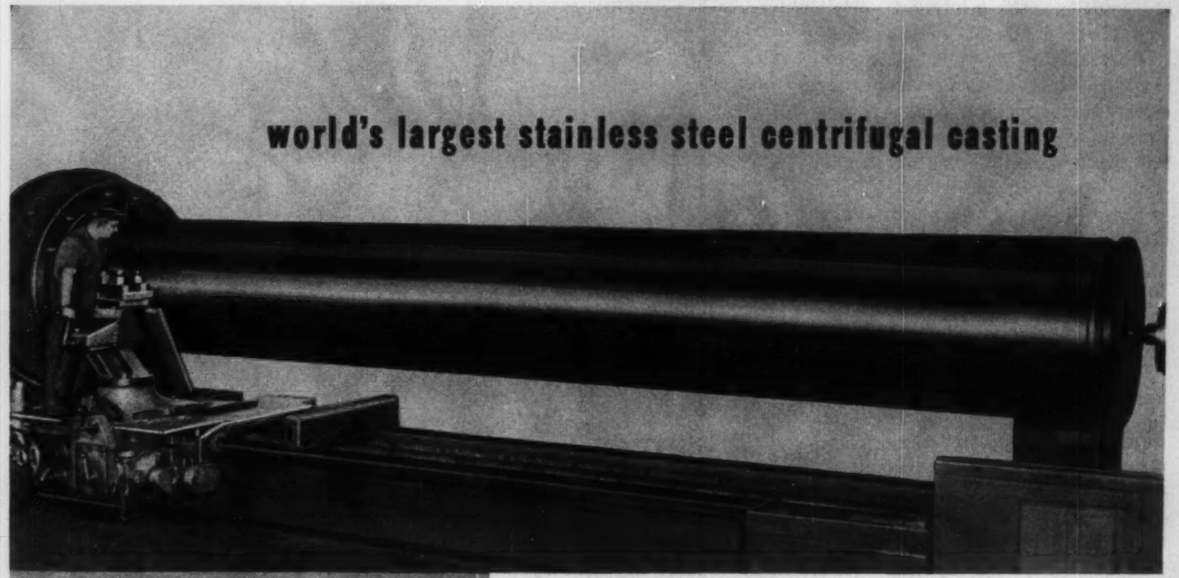
1906 . . . 1956

of Electric Steelmaking

The first heat of electric steel was made on Apr. 5, 1906, at Halcomb Steel Co., Syracuse, N. Y.—now a part of the Crucible Steel Co. of America. The furnace was a two-electrode, rectangular type of 4-ton capacity (photo above left).

Two years later, the Firth-Sterling Steel Co., McKeesport, Pa., installed a similar but smaller furnace. In 1909, a 15-ton three-phase furnace was installed at the South Works of the Illinois Steel Co., South Chicago, Ill. This was the largest electric steel furnace in the world.

Today's largest steelmaking electric furnace started up at McLouth Steel Corp., Detroit, about two years ago (photo above right). Its capacity: 200 tons, with a 24½-ft shell.



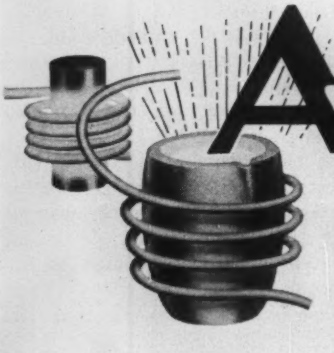
... cast by
SANDUSKY
... melted in
AJAX Furnaces

Here, at Sandusky Foundry and Machine Co., is Ajax induction melting at its best. Here . . . where furnaces of up to 5 tons capacity melt metal for centrifugal castings weighing up to 20 tons . . . Ajax Northrup induction equipment has simplified techniques, improved casting quality and permitted a cleaner, more efficient shop.

The Sandusky installation typifies a melting technology that has revolutionized foundry procedures . . . casting parts of accurate analysis faster and with less waste. Sandusky also represents extreme flexibility of induction melting. Two motor-generator sets permit complete freedom of choice when selecting melting facilities for a particular job.

These advantages of Ajax-Northrup induction melting equipment can be realized in your foundry . . . whether ferrous, non-ferrous, or both. Write Ajax Electrothermic Corp., Trenton 5, New Jersey, for additional details in Bulletin 27-B.

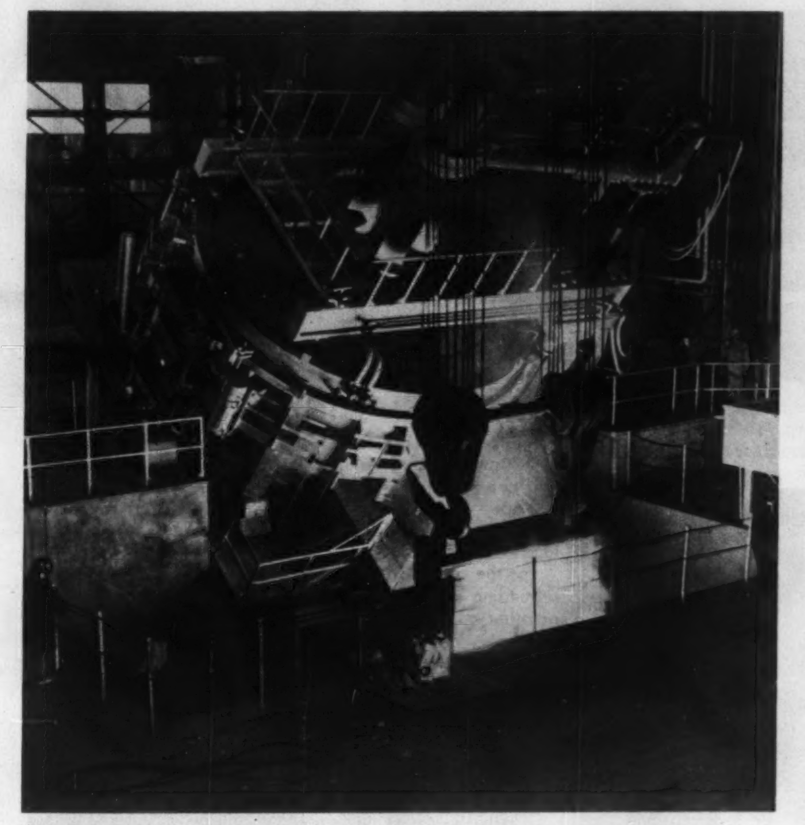
Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



AJAX NORTHRUP SINCE 1916

AJAX

INDUCTION HEATING-MELTING



Tapping a 100-ton Lectromelt furnace

use of oxygen converter metal in the electric furnace to make alloy steel is a promising possibility. Another one: The reduction of chrome ore in the oxygen converter, then duplex into the electric furnace to make stainless. There are predictions that new developments in use of oxygen in steelmaking may be particularly favorable to electric furnace practice.

Quality may push electrics in alloy steelmaking. States Harry W. McQuaid: "In alloy grades there will be increased pressure for lower sulphur heats and for steels with improved transverse yield properties. The electric furnace will be an important factor in this program."

Size Vs. Economics — Electric furnaces have been getting bigger. The largest was installed about two years ago for McLouth Steel Corp., Detroit, by American Bridge Division, U. S. Steel Corp. Capacity is 200 tons with a 24½-ft shell.

Are we getting close to the leveling off point?

Here's the viewpoint of Swindell-Dressler's Mr. Hanff: "These larger capacities have shown lower direct melting costs, but there is some indication that lower roof and refractory life, as well as operating difficulties, may be a deterrent to the use of still larger capacities.

"There is no question that furnaces up to 30 ft or perhaps larger can be built," Mr. Hanff continues. "Larger diameters involve increase in roof refractory thickness and weight. As electrodes become larger and go further from the supporting structure, the larger motors and their precise regulation become a serious problem. It is quite probable that if furnaces become larger, the use of more than three electrodes will be favored."

Advantage Here—Mr. Holmquist sees some advantages in a bank of smaller furnaces. He says: "To get high-load factor to demand requires a multiplicity of units. High-load is the best means of reducing the effect of demand charge on power cost. In many instances, this might indicate the desirability of more furnaces of less than maximum available size for a given total capacity."

On the side of larger furnaces, Mr. Holmquist has this to say: "The size of a furnace determines, to a considerable degree, the cost above raw materials. There are several items which are fairly constant—kva per ton, pounds of electrode per ton, fluxes, refractories and mold cost. The remainder of cost items are reduced by higher output. . . Duplexing through electric furnaces is possible and probably will be more economical with large units."

Power Supply—Mr. Wallis reports that there is no difficulty from a mechanical standpoint of building a 250-to-300-ton tilting arc furnace. "The chief problem," he says, "is power supply. The maximum size units under construction call for 36,000-kva substations. There already are several 45,000-kva units of 200-metric-ton capacity under construction."

Summing up the size picture, J. W. Shea, manager of National Carbon Co.'s electrode technical service department told STEEL: "There appears to be some difference of opinion among furnace manufacturers on this point. Some feel still larger furnaces of conventional design are feasible while others think we may have reached the practical limit in the 24 or 25-ft shell diameter with three electrodes and swing-aside roof.

"Oval shapes with six electrodes and shallower baths to facilitate charging hot metal may be a possibility. One designer has suggested fixed electrode masts with shells moving on tracks from under them for charging.

"Improvements over the years in electrode quality and in the method of their use, plus larger electrode diameters, have made possible larger and larger furnaces. Our expectation is that the trend toward still larger furnace capacities will continue."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

RESTORE BUS TUBES

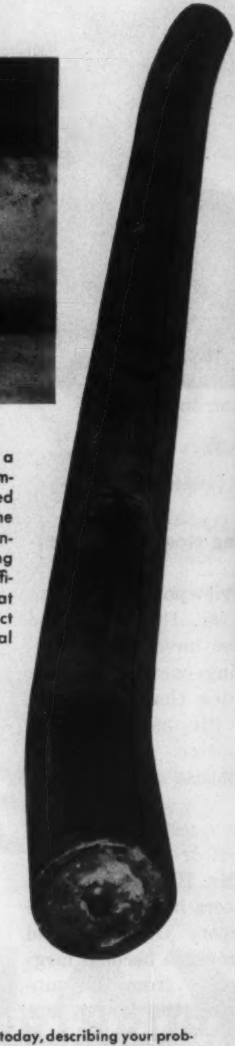
FULL EFFICIENCY AT SUBSTANTIAL SAVINGS!

Wilson Welding Company's rebuilding process gives new life to old bus tubes and eliminates the necessity of costly replacements, thus reducing operating and maintenance costs.

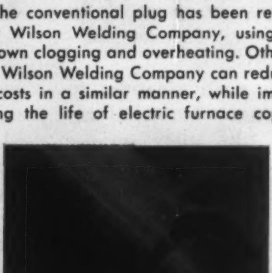
Badly pitted and scarred contact surfaces are restored by Wilson Welding Company's patented method of copper and copper alloy welding. Tubes can be straightened and reshaped to conform to original drawings and specifications, and when desired, design changes can be made to improve performance.

For the answers to any of your problems concerning the rebuilding or modification of bus tubes, electrode holders, or other copper components of electric arc furnaces, write to Wilson Welding Company, Inc., Box 1634, Huntington, West Virginia.

The photograph above shows the condition of a bus tube as received at Wilson Welding Company's shop. Contact surfaces are badly pitted and scarred, and tube is bent. At the right is the same tube reconditioned and straightened. Contact surfaces have been rebuilt by Wilson Welding Company's patented process, and operating efficiency has been improved due to the fact that the rebuilt contact ends are machined to exact tolerances which in most instances the original bus tube ends are not.



Plugs have been removed from the bus tubes in the photograph above to show the dirt and sludge which have accumulated to impede the free flow of coolant. The result is overheating, causing damage to both bus tube and electrode holder. In the lower photograph, the conventional plug has been replaced by a plug developed by Wilson Welding Company, using a concentric reducer to cut down clogging and overheating. Other design changes developed by Wilson Welding Company can reduce operating and maintenance costs in a similar manner, while improving efficiency and prolonging the life of electric furnace copper components.



WILSON WELDING

Write today, describing your problem and requesting information. All inquiries handled promptly.

221 HIGH STREET BOX 1634 HUNTINGTON, W. VA.

Save Money by Rebuilding Electrode Holders with New Process

WILSON WELDING

Wilson Welding Company has developed a process formerly considered impractical for fusion welding of copper and copper alloy, making it possible to rebuild burned, pitted or scarred electrode holders, bus tubes, cable clamps, and other copper components used with all types of electric arc melting and smelting furnaces.

These photographs demonstrate graphically the results obtained in restoring at a fraction of replacement cost a badly damaged holder to a condition comparable to that when new, conforming to original specifications.

This customer, a major steel producer, was able to put this holder back in operation in a matter of days. Shipment was made within five days after receipt of the damaged holder in Wilson Welding Company's shop. Delivery of a new one, at more than double the cost of repairs, would have required months.

BEFORE REBUILDING, this electrode holder was badly burned, pitted and scarred, and its operating efficiency impaired, resulting in higher operating costs. Components repaired by Wilson Welding Company's methods do not have the porosity of the original copper castings, with the result that conductivity is usually improved, and longer life with lower operating costs assured.

CONCEALED DAMAGE is not always apparent. After work was begun on this holder—the same one shown at left—weaknesses in the cooling tubes were revealed. Wilson Welding Company's process uncovers and rebuilds damaged areas like this. In every case, cooling tubes are checked for leaks, and every rebuilt holder is subjected to water pressure tests and thorough inspection.

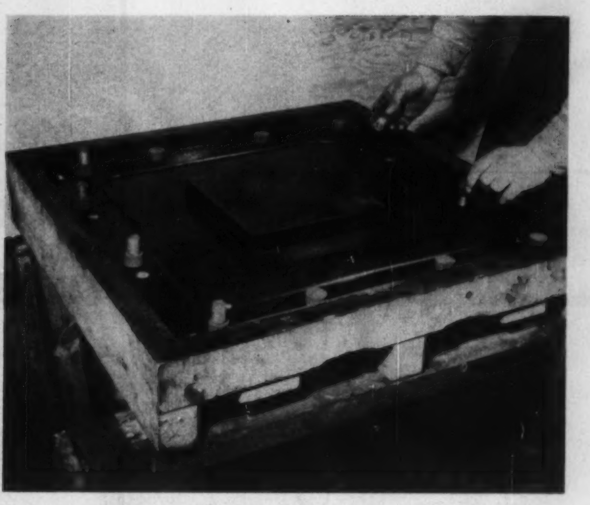
AFTER REBUILDING, the electrode holder shown at left looked like this. Its performance will be equal to or better than that of a new one. In this case, a smooth contact surface was desired, but surfaces can be serrated, dimensions modified, and other design changes incorporated when desired. Work was completed and shipment made within five days after receipt of the damaged holder.

Wilson Welding Company, Inc.

COPPER AND COPPER ALLOY WELDING

221 HIGH STREET
ALTIZER ADDITION
BOX 1634
HUNTINGTON
WEST VIRGINIA

First step is making small sand cores on which inserts are placed in the mold. Insert size shown is ⅝-11



Cores are baked for ½-hour at 450 to 475°F. Baked insert cores are placed in holes in the large corebox

Cast-in Thread Inserts Anchor Costs

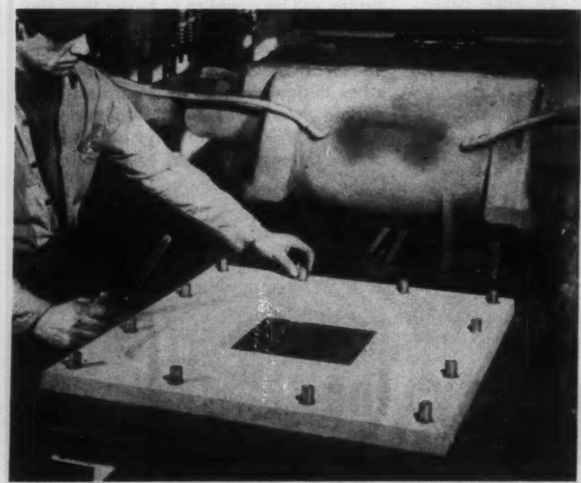
STAINLESS steel threads are being cast in gray iron at E. L. Le Baron Foundry Co., Brockton, Mass. The process slashes materials handling costs and eliminates drilling and tapping on large parts.

The foundry uses wire thread inserts made by Heli-Coil Corp., Danbury, Conn. They are placed in the mold on sand cores. The hot metal flowing around the inserts forms a bond just short of fusion. Standard blast cleaning removes the cores from inside the inserts.

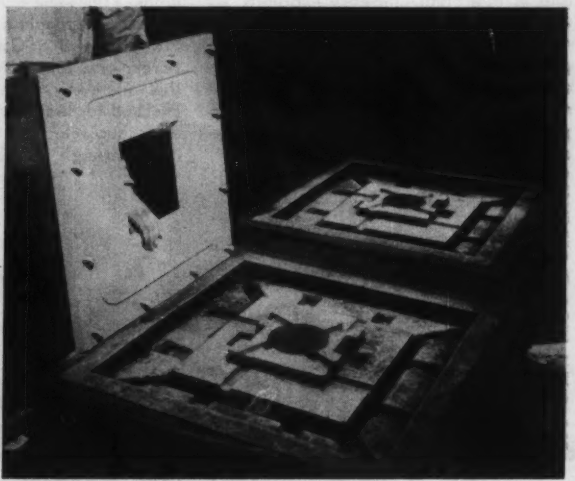
Better Product — The foundry specializes in gray iron castings for manhole frames, covers and gratings. The cast-in inserts provide permanent threads in the frame for bolting on the manhole cover.

Previously, Le Baron drilled and tapped the threads. This meant moving castings weighing up to 400 lb to the foundry's machine shop, setting up each casting and making a drilling template as well as drilling and tapping each hole. Casting-in stainless steel threads not only gives an improved product but permits the foundry to speed up shipment of finished castings.

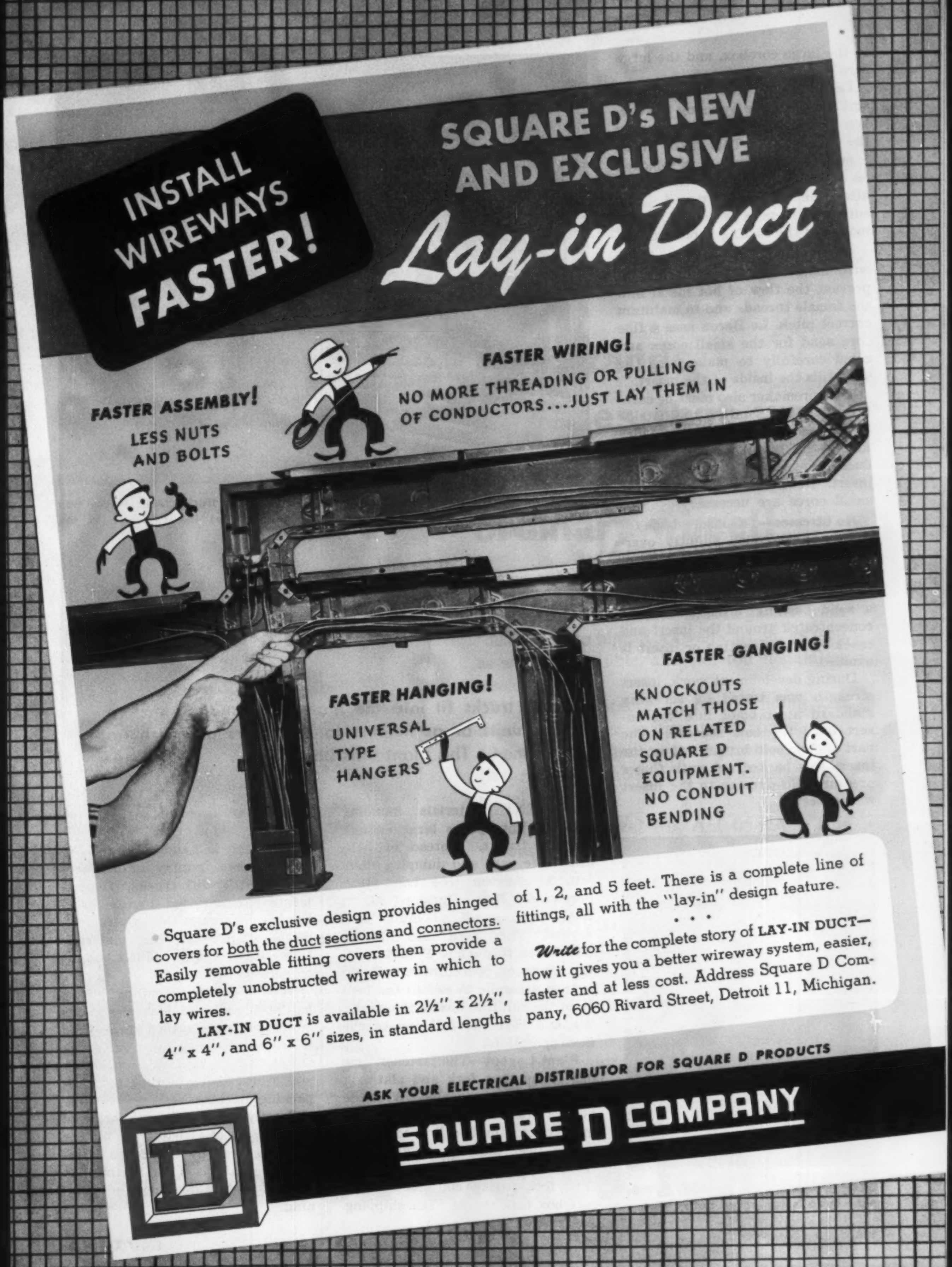
Casting Procedure — A small sand core is made in a special core box. (It takes about 6 minutes to make the 12 required.) Cores with inserts are baked for ½-hour at 450 to 475°F. They are placed



Large corebox is filled with sand and core is hardened. It is drawn on a standard molding machine



Core with inserts is placed in the mold and the casting is ready to be poured



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FASTER ASSEMBLY!

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UNIVERSAL TYPE HANGERS

FASTER GANGING!

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Square D's exclusive design provides hinged covers for both the duct sections and connectors. Easily removable fitting covers then provide a completely unobstructed wireway in which to lay wires.

LAY-IN DUCT is available in 2½" x 2½", 4" x 4", and 6" x 6" sizes, in standard lengths of 1, 2, and 5 feet. There is a complete line of fittings, all with the "lay-in" design feature.

• • •

Write for the complete story of **LAY-IN DUCT**—how it gives you a better wireway system, easier, faster and at less cost. Address Square D Company, 6060 Rivard Street, Detroit 11, Michigan.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

in the large corebox, and the large core is made.

Le Baron avoids baking the small cores twice by using the carbon dioxide method of hardening the large core. This takes about 1 minute. The corebox is removed on standard foundry equipment after the core is hardened. The core with inserts is placed in the mold and the casting is poured.

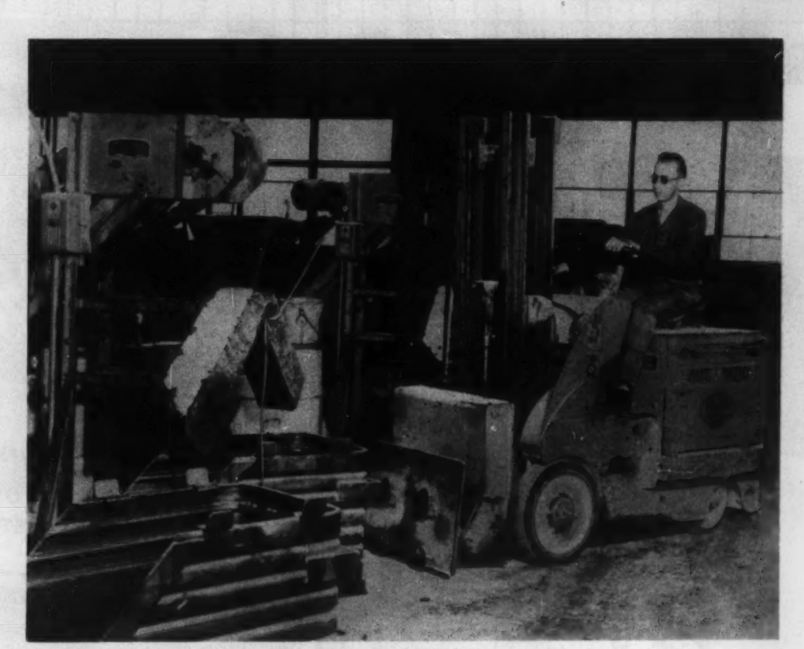
Coremaking Care—Coils of the wire insert are tightly wound to prevent the flow of hot metal into the female threads and to maintain correct pitch. Le Baron uses a fine core sand for the small cores and rams carefully to make sure the sand fills the inside of the insert.

The coremaker also must be careful not to get sand on the outside of the insert. This interferes with lifting the large corebox and reduces the fusion of cast iron to the insert. Reinforcing screws in the small cores are necessary.

No Stresses—The insert made for casting-in is coiled slightly oversize to allow for the shrinkage of cast iron on cooling. Because the coils are flexible, not rigid as in a solid bushing, stresses are not concentrated around the insert and cracking of the casting or insert is avoided.

During development work, insert strength was tested by screwing standard steel bolts into the insert until the bolt sheared. The part of the bolt broken off in the insert was backed out with finger pressure. No damage to the insert was observed.

Cast-in wire inserts provide permanent threads for cover bolts



Rivets will feed into either box from this Y-chute. Lift truck places empty box under one chute; operator turns handles and carries the full box to the next operation

Lift-Size Tote Boxes

Lift trucks fit into the materials handling picture as units or as helpers to conveyors or overhead cranes. This plant uses both

EFFICIENT materials handling calls for tote boxes large enough for lift trucks. Instead of handling tote pans and dumping them into a common tote box, Gray Screw & Bolt Division, Gary, Ind., uses small elevator conveyors. They feed into lift-size tote boxes through a Y-chute. All the lift truck operators have to do is turn a handle to switch the feed from the full tote box to the empty one and cart the full one to the next operation.

Plant Layout—The fastener firm has found that fork and platform trucks are indispensable. With the help of cranes and conveyors, they move over 7 million lb a month.

The fleet includes walking-type transporters, pallet-type units, two rider fork trucks, coil and adapted tote box fork trucks. The shipping department uses lift trucks exclusively.

Receiving is handled largely by an overhead, gantry crane, supplemented by lift trucks. Departments are serviced by an overhead crane system that covers 200,000 sq ft. Transferring materials between bays and buildings is done by conveyor systems.

Most materials handling in the hot bolt and cold bolt operations is done by an overhead crane. Cold rivets are handled by a lift truck and tote box that is dumped directly into chutes leading to a keg packing machine.

Conveyors—Fasteners packaged in cartons are delivered to the shipping area by conveyors. Cartons are palletized for further lift truck handling, storing and shipping.

US RUBBER Centerless Work Wheel

Withstands stresses that would break down the ordinary wheel!

This porous rubber-bonded wheel will
(1) take roughing and finishing cuts from "dead soft" to high Rockwell carbon, as well as work hardenable, alloy, or tough stainless steels.
(2) absorb vibration in tube grinding and impact on off-size or distorted pieces.
(3) grind with uniform temperatures.
(4) reduce number of wheel changes and wheel inventory.

Specify U.S. Wheel No. A60-05-RA9. This porous wheel has done the above jobs for many manufacturers—and will do the same for you.

EXTRA DIVIDEND: Remember that when you buy wheels from United States Rubber Company salesmen, you are dealing *direct* and are being served by a specialist—a man whose only job is selling and *servicing* abrasive wheels. He will see that you get maximum value out of your abrasive wheel dollars. Write us at Rockefeller Center, New York 20, N. Y.

US RUBBER **Mechanical Goods Division**
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Tailored Tools Meet Schedules

SPECIAL-PURPOSE machines are keeping America's watchdogs in the sky. These semiautomatic units constitute a unique production line for one of our "hottest" jet engines, the Curtiss-Wright J-65.

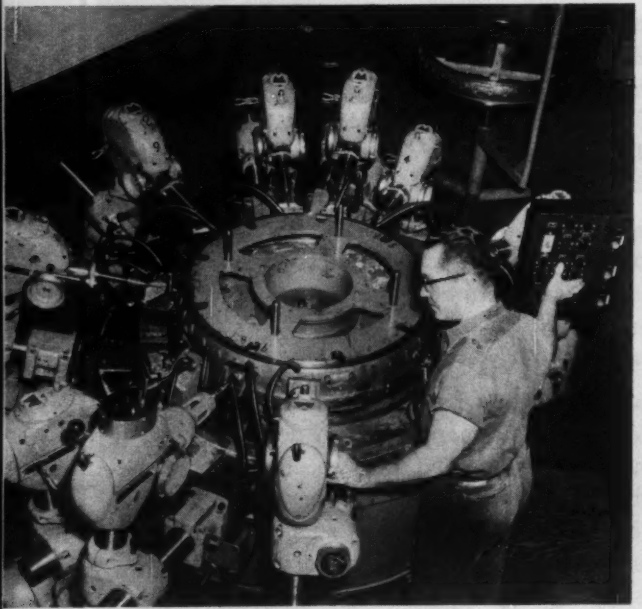
The photos on these two pages show some of the tailored tools Ryan Aeronautical Co., San Diego, Calif., has designed from the floor up for fabricating J-65 assemblies.

Problems—Ryan produces five housing assemblies for the engine, both from 321 stainless steel and new Timken 1722A alloy. Contours are so complex they make conventional drilling with established tools impractical.

The use of two distinctly different metals causes other problems, such as differences in weld shrinkage, forming qualities and hardness. Different cutting techniques must be used.

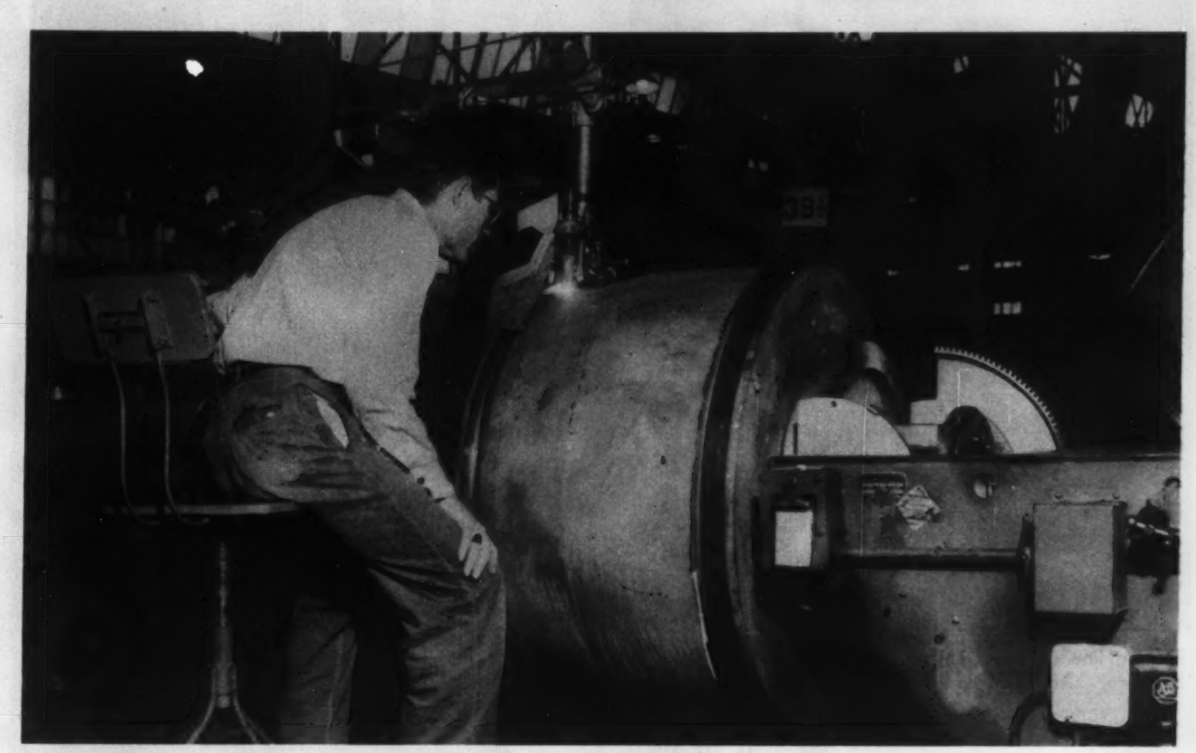
Extremely close tolerances are required by Curtiss-Wright on all J-65 components. The special tools, designed for accuracy as well as high rate of production, are paying for themselves in savings of manpower and ability to meet schedules.

This combination drilling and scalloping machine cuts sixty 2½-in. radius scallops and drills 150 holes to close tolerances. With standard machines, the time required for the job would be prohibitive. Operator is lowering one of five Ryan-built J-65 assemblies into the machine



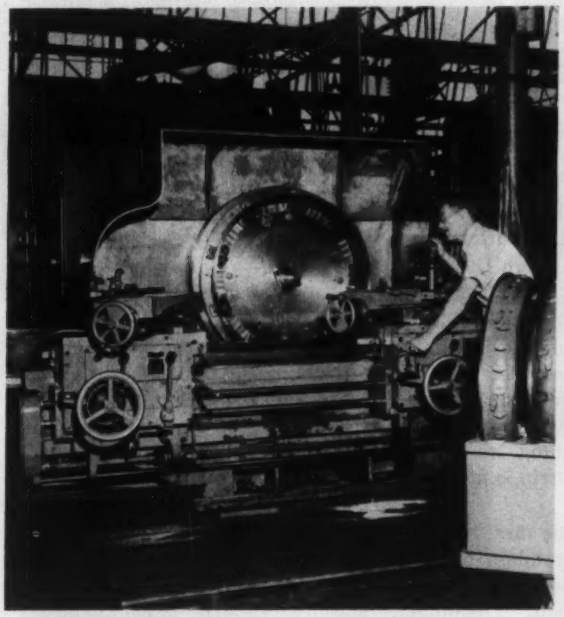
Magna drill heads grouped around a Ryan-built indexing table simultaneously drill four different size holes which are located within 0.005-in. true position. One operator can drill 90 holes in each assembly with 14 settings—nine using all nine drills, three drilling seven holes and two settings drilling two holes

Most welders on the J-65 project are women. They weld 18 small round bosses and 9 oval bosses on the assembly. These are the castings through which holes will be drilled for the fuel injection system. The castings are held in place for welding by jigs of Ryan's design. All welds are subjected to magnetic and x-ray inspection

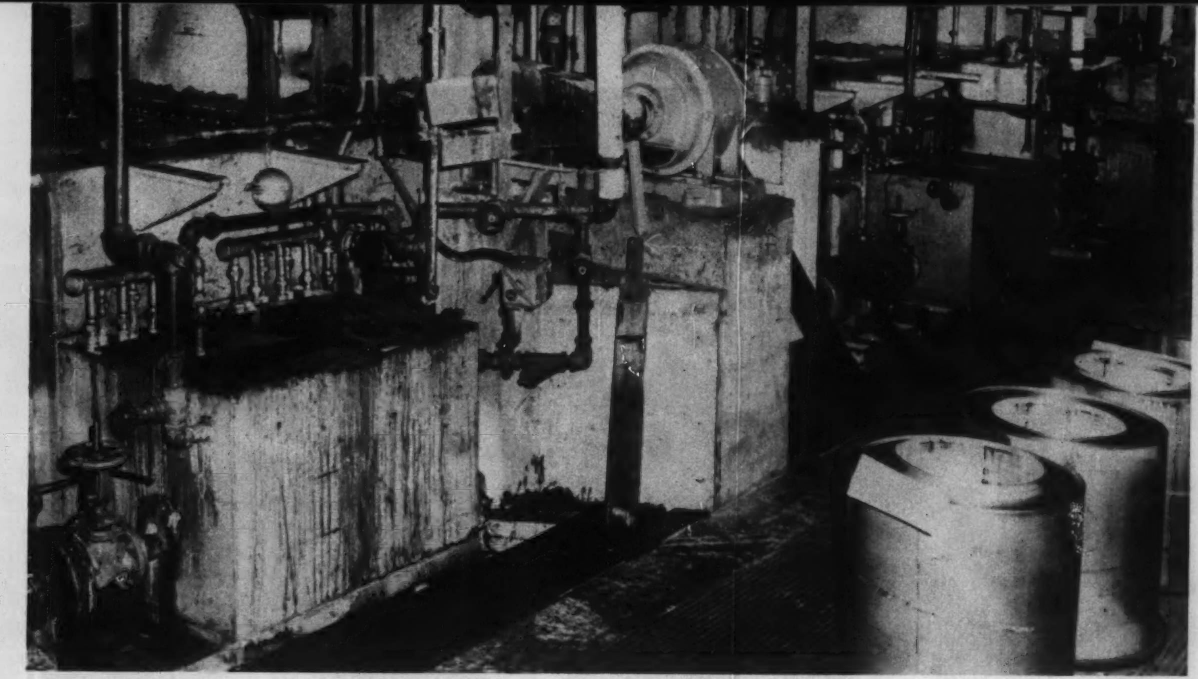


Special weld fixtures hold parts rigid and prevent warpage in circumferential welding of flanges to skin. There are five of these. They are of the internal expanding type, with copper back-up and argon gas shielding for heliarc welding. Rod feed is electronically controlled

A 600-ton expanding mandrel is used for three sizing operations to insure accurate contour and size of Wright J-65 housing assembly skin



Protruding tangs, which hold J-65 fuel injector unit, are machined in an adapted Lodge & Shipley T-lathe. Three surfaces on the inner tangs can be turned at three different angles. Another modified tool is a Warner & Swasey tapping machine with a special fixture and Ryan-built indexing table. This machine threads 63 holes in each assembly



Pickling line at Scovill Mfg. Co. Cast stainless spray pump and stainless holding tanks for bichromate are in foreground. Sulphuric acid tanks are in background

Spray Pickling Brass Strip

THE CONTINUOUS brass mill at the Scovill Mfg. Co., Waterbury, Conn., handles the heaviest cold-rolled, nonwelded brass coils in commercial use in the brass industry. Operations are geared to a continuous casting unit which turns out consistently uniform slabs.

Each of the two strip pickling machines, built by Metalwash Machinery Corp., Elizabeth, N. J., can handle strip up to 30 in. wide at speeds up to 600 fpm.

Pickling Cycle — Strip goes through: 1. Warm sulphuric acid power spray pickle. 2. Warm bichromate power spray. 3. Cold fresh water spray rinse to sewers. 4. Warm sulphuric acid power spray pickle. 5. Recirculated power spray cold water rinse, combined with fresh water rinse. 6. Recirculated power spray soap rinse. 7. Hot water fresh spray rinse to sewers. 8. Hot air blast.

Each of the pickling lines is more than 150 ft long and has supplementary coil handling equipment consisting of a coil payoff reel, feed rolls and metal flattener. A winding reel for light metal and a coiler for heavier strip are installed at the discharge end of the lines.

Continuous—Brass strip is pulled through the pickling area at a predetermined speed by a device known as a "leader-bar." It automatically releases at the discharge end, then returns through the machine to the feed end to connect the next strip to the payoff reel.

A coil of strip fed into the line has an uninterrupted run to the end. This technique results in a uniformly clean surface without overpickling or etching in spots, which occurs when strip is stopped for stitching.

Equipment—In the first power spray pickle, two stainless pumps are used. Each has 350 gpm capacity at a 60-ft head. The solution contains 10-per-cent sulphuric acid and some copper sulphate at 140°F. The second cycle—the bichromate pickle—uses a stainless pump of 200 gpm capacity at a 60-ft head. This solution contains 10-per-cent sulphuric acid and 3-per-cent bichromate at room temperature.

Stainless pumps of 200 gpm capacity at a 60-ft head are used in the second sulphuric acid power spray pickle and the recirculated power spray cold water rinse.

Stainless Alloys—Each of the pump bodies is made of type CN-7M alloy, which has high resistance to hot sulphuric acid. Type CF-8M alloy is used in the accessory flanges and valves because it provides good resistance to pitting corrosion caused by acid salts. In the pickling of copper-bearing materials, copper sulphate is readily formed and attacks all surrounding parts.

For accessory equipment, and components not in direct contact with pickling acids, type CF-8 cast stainless alloy is used extensively. Pumps handling the spray soap rinse, brackets, structural supports and pump mountings are made of this alloy which resists a wide variety of acid and alkaline corrosive environments.

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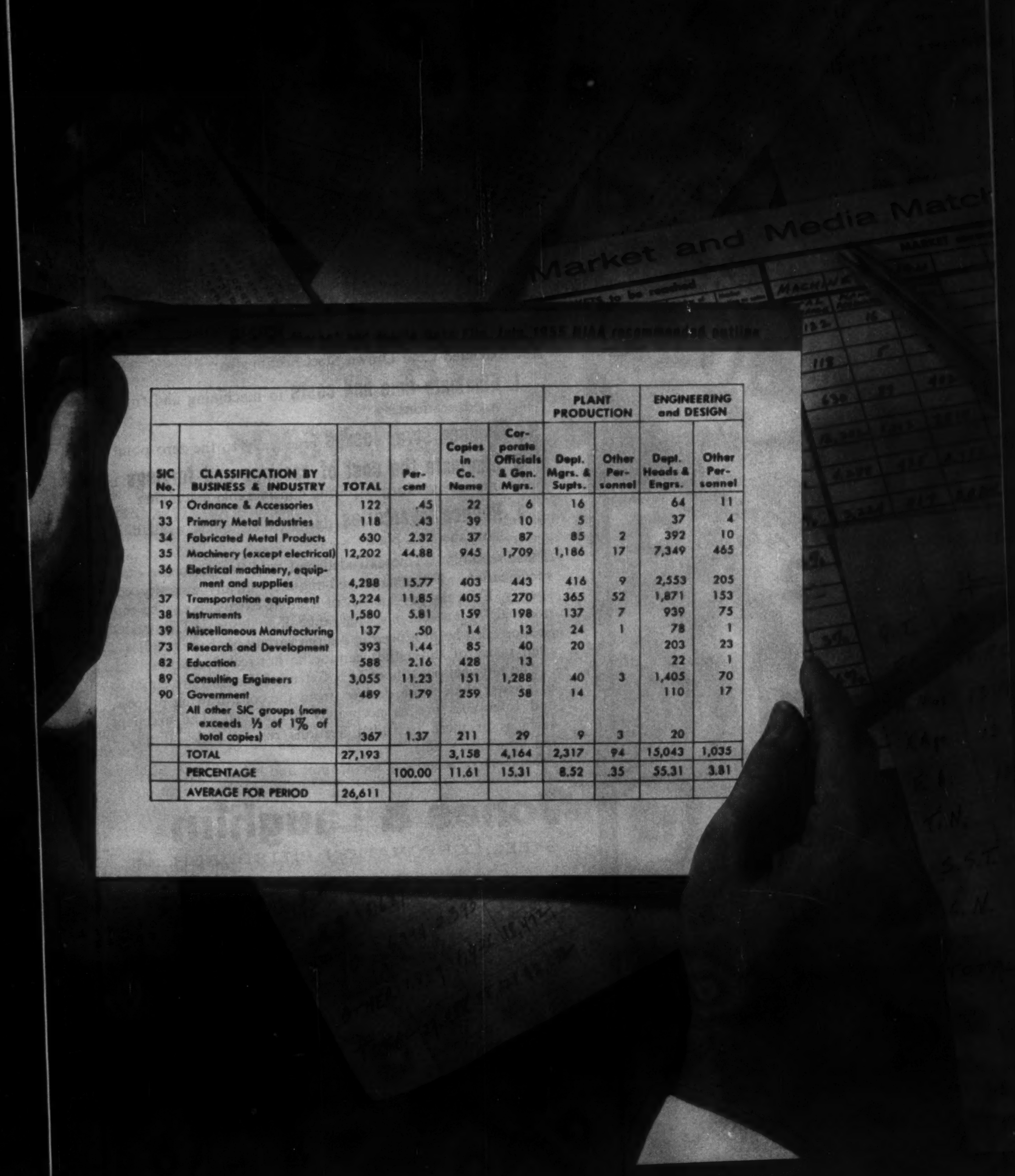

						PLANT PRODUCTION		ENGINEERING and DESIGN	
SIC No.	CLASSIFICATION BY BUSINESS & INDUSTRY	TOTAL	Per-cent	Copies in Co. Name	Cor-porate Officials & Gen. Mgrs.	Dept. Mgrs. & Supts.	Other Per-sonnel	Dept. Heads & Engrs.	Other Per-sonnel
19	Ordnance & Accessories	122	.45	22	6	16		64	11
33	Primary Metal Industries	118	.43	39	10	5		37	4
34	Fabricated Metal Products	630	2.32	37	87	85	2	392	10
35	Machinery (except electrical)	12,202	44.88	945	1,709	1,186	17	7,349	465
36	Electrical machinery, equipment and supplies	4,288	15.77	403	443	416	9	2,553	205
37	Transportation equipment	3,224	11.85	405	270	365	52	1,871	153
38	Instruments	1,580	5.81	159	198	137	7	939	75
39	Miscellaneous Manufacturing	137	.50	14	13	24	1	78	1
73	Research and Development	393	1.44	85	40	20		203	23
82	Education	588	2.16	428	13			22	1
89	Consulting Engineers	3,055	11.23	151	1,288	40	3	1,405	70
90	Government	489	1.79	259	58	14		110	17
	All other SIC groups (none exceeds ⅓ of 1% of total copies)	367	1.37	211	29	9	3	20	
	TOTAL	27,193		3,158	4,164	2,317	94	15,043	1,035
	PERCENTAGE		100.00	11.61	15.31	8.52	.35	55.31	3.81
	AVERAGE FOR PERIOD	26,611							

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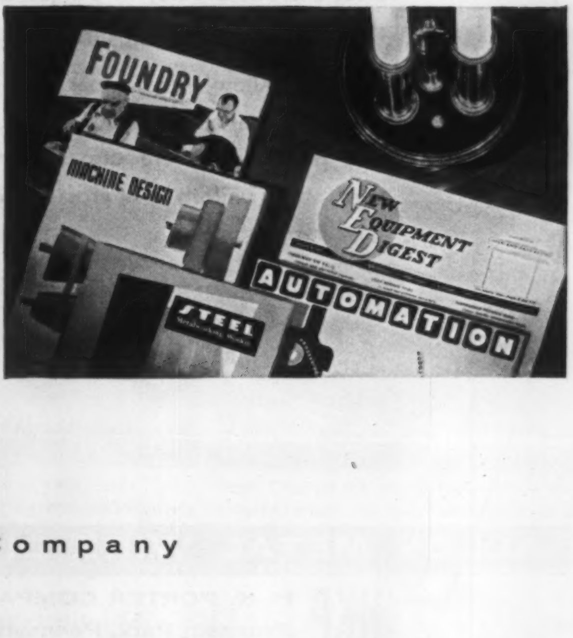

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Alloy Special Wire Shapes reduce costly machining time and cut metal waste. No need to start with round wire and machine half of it away to get the shape you want. We can supply you with Stainless Steel and Nickel Alloy wire in just about any special shape you may require.

Drawn Alloy Wire Shapes provide other advantages in addition to reduced costs. Product quality and performance are also improved. The drawn wire insures uniformity of cross-section and a smooth, flaw-free surface.

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ALLOY METAL WIRE DIVISION

HKP H. K. PORTER COMPANY, INC.
Prospect Park, Pennsylvania

Thickness Gage

A POWERLESS thickness gage is the latest for measuring nonmagnetic films on iron or steel. Using a magnetic principle, it measures paint coatings, platings, enamels and plastic sheet materials with an accuracy of 10 per cent in the calibrated range.

The gage consists of a double range scale (a high range from 0.001 to 0.060-in. and a low scale from 0.000 to 0.007-in.), a range changer, calibration adjuster, adjustable limit pointers and reference thickness standards.

A "go-no go" feature is built into the gage to help the inspector. After the instrument is calibrated and adjusted, the inspector only checks the null pointer to make certain that it stays within the limit pointers. The gage must be calibrated for each thickness.

GAGE
. . . measures enamel thickness

Works—The instrument uses an internal Alnico magnet to provide magnetic flux to the contact feet. A variable air gap in the circuit (introduced by the variable thickness of the film on the backing material) causes flux changes. The thicker the film, the more flux will leak between the two contact feet. A GE gaussmeter-type movement measures this internal leakage.

Other features are the ability to measure both conducting and nonconducting coatings, wear-resistant, chrome-plated probes and greater readability at the lower end of the dual range scale.

The instrument is made by General Electric's Lynn, Mass., Instruments Department. Extra standards are available.

Dow . . . industry's most complete line of chlorinated solvents

Safer. Lower toxicity and lower fire hazard make Chlorothene much safer for spray applications than other commonly known solvents. Chlorothene has an MAC rating of 500 ppm—20 times greater than carbon tet!

Better solvent action for cold degreasing with versatile, safer

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Chlorothene* (Dow 1, 1, 1—Trichloroethane, Inhibited) is sold exclusively by your Dow distributor. He's also the man who supplies DOW TRICHLOROETHYLENE, DOW PERCHLOROETHYLENE and DOW METHYLENE CHLORIDE for vapor degreasing and other specialized cleaning operations. Write to THE DOW CHEMICAL COMPANY, Dept. S 941B, for more information.

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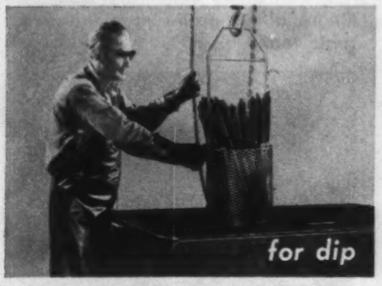

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Versatile. A product of many uses, Chlorothene is described by enthusiastic users as "the best general-purpose cold degreaser . . . by far the safest and the easiest to use!"

Fast. Chlorothene cleans faster, more thoroughly—poses no skin absorption problem. Its topical effect is similar to that of other good organic solvents.

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PEARLITIC MALLEABLE CASTINGS

Cast pearlitic malleable steering gear housing—by NATIONAL

AA-2911 A

In mines and quarries . . . on the big construction jobs—that's where trucks take the worst beating. And that's also why many off-highway truck manufacturers have turned to pearlitic malleable castings—by National—for heavy duty parts. For truck builders know that pearlitic malleable has high ultimate strength . . . resists wear and fatigue under heavy loads and impacts.

And there are lots of other "plus" advantages in pearlitic malleable castings—from National. For example, they possess excellent non-seizing properties . . . can be either liquid or air-quenched . . . can be given a smooth finish. Perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel=100).

Pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase quality and sales potential of *your* product.

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The nation's largest independent producer of malleable and pearlitic malleable

Dryer Cupola Air

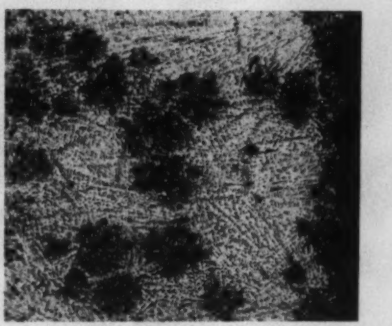
It assures more uniform microstructure in piston ring castings at the foundry

CHEMICAL dehumidification cuts costs and maintains metallurgical quality in piston ring castings at Muskegon Piston Ring Co., Sparta, Mich.

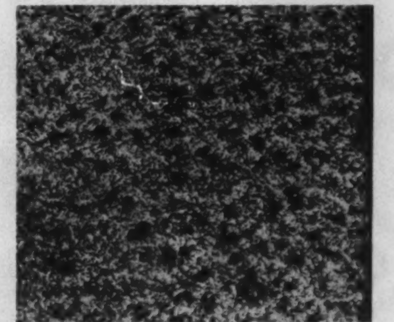
Cupola dry blast with a constant moisture content of 3 grains per cubic foot guarantees production of piston ring castings of uniform microstructure.

What Could Happen—Without such control, the foundry would risk lower carbon, manganese and silicon contents of the iron and a need for more coke. Piston rings become white and hard when the moisture content of the blast rises above 3 grains.

The foundry uses Kathabar humidity conditioners, made by Surface Combustion Corp., Toledo, O. Their lithium chloride base solution absorbs moisture from the air at a controllable rate continuously and automatically. Muskegon has three dehumidifying units.



Photomicrograph (X100) of piston ring iron made under dry blast conditions of 10 grains of moisture per cubic foot



Photomicrograph (X100) of piston ring iron made under dry blast conditions of 3 grains of moisture per cubic foot

THEY'RE *Really* JUDGING

YOUR PRODUCTIVE EFFICIENCY

When people are deciding what they want to put out their hard-earned money for, they take a pretty careful look and make tough-minded comparisons. What they're really judging, perhaps without consciously thinking of it that way, is the ability of the manufacturer to produce efficiently. Other factors being equal, the manufacturer who can put more into his product for the money gets the biggest share of the nods.

LET CLEARING HELP YOU MODERNIZE FOR HIGHEST EFFICIENCY

If your product is made from stamped metal parts, Clearing engineers can help you produce at a lower cost. They'll tell you about recently developed presses, that run twice as fast as conventional machines, they'll discuss methods of cutting down in-process material handling. To meet the challenge of tomorrow's market place, modernize your manufacturing setup with truly modern equipment. Call a Clearing man today. Clearing Machine Corporation, 6499 West 65th Street, Chicago 38, Illinois. Hamilton Plant, Hamilton, Ohio.

These Clearing presses provided an improved production method for a prominent automotive parts manufacturer. Details on request.

Write for Clearing brochure "Thinking of a better way to do the job?"

CLEARING PRESSES THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION *Division of U. S. INDUSTRIES, Inc.*

Announcing...

K7H

NEW KENNAMETAL* GRADE FOR HIGH VELOCITY MACHINING

Grade K7H is the hardest Kennametal ever offered for steel cutting . . . 93.5 Rockwell A. This high hardness, combined with exceptional strength—even at higher temperatures—provides a long-wearing, "balanced" cutting edge for high velocity machining at light to moderate feeds.

K7H was developed after months of cooperation with machine builders to match ever-increasing spindle speeds with the best possible cutting material for finishing operations. It is especially suited for facing, profiling, turning and boring steel alloys, high-tensile steels and "hard-to-machine" jet engine materials such as Inconel, 400-series stainless and nickel base alloys.

In tests on high-tensile steel, operating at ⅔ higher speed and 50% heavier feed, Kennametal Grade K7H consistently shows two to three times more life than the many other carbides and cutting materials that were tested.

K7H is only available in Kendex throw-away type inserts. Why not have a Kennametal tool engineer help you take full advantage of this remarkable new grade. Call him today or write, KENNAMETAL INC., Latrobe, Pennsylvania.

*Registered trademark

B-8819

INDUSTRY AND

KENNAMETAL

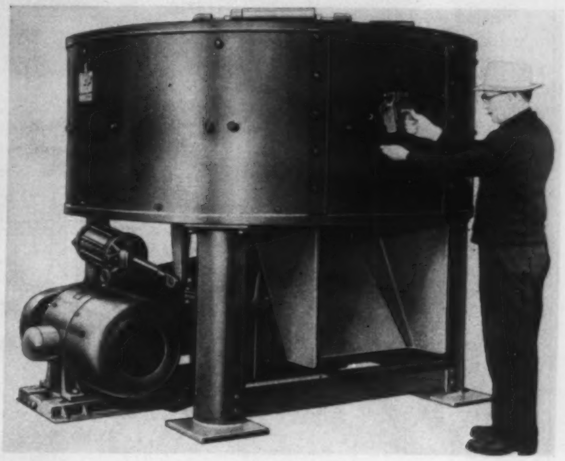
...Partners in Progress

CHARACTERISTICS OF GRADE K7H

- High wear-resistance
- Maximum crater-resistance
- High strength in relation to hardness
- Retains strength at higher temperatures
- Ideal for high velocity cutting

Remember,
it's a Carbide . . .
it's Kennametal . . .
it's available now

Sand Mixer Has Capacity of 3000 Lb.



The Model 2½F Simpson Mix-Muller will handle 45 cu ft of material per batch.

A 60-hp motor powers spring-loaded mullers that provide an effective weight range of 1200 to 3000 lb.

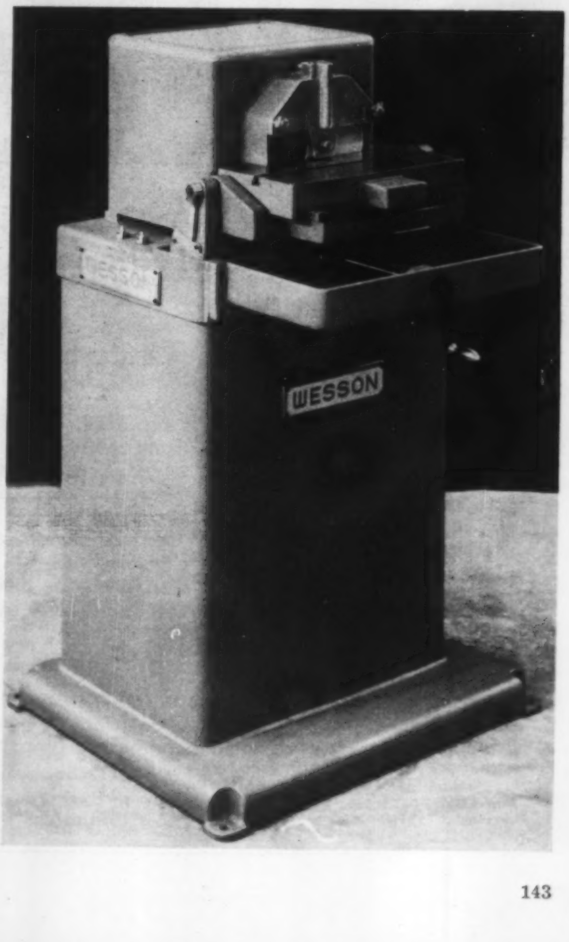
The unit has a 90-in. pan diameter and a crib 33 in. high. The steel crib liner is renewable; wear plates are segmented and replaceable.

A material sampler is built in, and a removable section gives access for maintenance and makes removal of mixing components easier.

Liquid is added through a perforated spray pipe which extends around the inner periphery of the mixer crib.

A centralized system is used for positive lubrication. *Write*: National Engineering Co., 549 W. Washington Blvd., Chicago 6, Ill. *Phone*: State 2-6148

Single Point Carbide Tool Grinder Produces Microfinishes



The offhand grinder eliminates all lateral tool movements that the operator ordinarily must make. It produces microfinishes on all standard and special single point tools, including square nose, V-nose, straight turning, lead angle, offset turning, facing and boring tools.

TruArc oscillation of the grinding wheel and the free-wheeling counterbalanced worktable reduce fatigue and make it possible to use nonskilled workers.

Only a slight pressure on the worktable is needed to feed the tool into the grinding wheel.

The motor-spindle unit is oscillated by a crank mechanism at 150 strokes a minute. In addition to eliminating lateral tool movement, oscillation across the carbide tip gives finer finishes, faster metal removal, longer wheel life and less chance of wheel gouging.

Uniform flatness of the wheel is maintained because the entire grinding wheel face reciprocates across the carbide tip.

Oscillation of the wheel generates a crosshatched pattern on the carbide tool, which is the result of the arcing movement of the rotating wheel as it moves laterally across the carbide.

The tool being ground stays fixed in the protractor workholder.

A dynamically balanced wheel adaptor, wheel spindle and rotor assembly provide vibrationless operation.

The 1-hp grinder is designed to use metal bonded wheels. *Write*: Wesson Co., 1220 Woodward Heights Blvd., Detroit 20, Mich. *Phone*: Jordan 6-1500

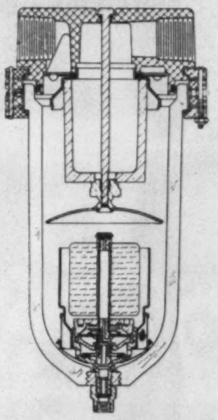
3 NEW NORGREN AIR LINE FILTERS

New Sizes of Automatic-Drain Filters

added to Norgren Line

Automatic-drain filters for use with ¾" and 1" air lines are now being manufactured by Norgren in addition to their present models for use with ¼", ⅜" and ½" air lines. Three filter elements are available —74, 64, and 25 microns.

Norgren Automatic-Drain Air Line Filters filter oil, corrosive moisture, abrasive pipe scale, rust and other solids from compressed air. A float controlled, pilot operated drain mechanism, operating under constant or fluctuating line pressures with or without air flow, automatically drains collected liquids. For trouble-free operation and reduced wear, the solids are prevented from entering the drain mechanism.



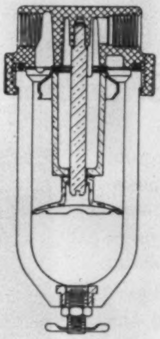
Models 11,200-6 and 11,200-8
¾", 1" Pipe Sizes

New Metal Bowl Filter

for higher temperatures and pressures

A new model replaceable metal bowl air line filter has been added to the Norgren line. The metal bowl allows the filter to be used at temperatures from —40° to 300°F and at pressures ranging up to 250 psi.

These filters are designed to create a strong centrifugal force that "wrings" a high percentage of moisture and oil from the air. A baffle traps liquids and solids in the Quiet Zone in the bottom of the bowl and prevents them from re-entering the air line. Three filter elements are available — 74, 64, and 25 microns.



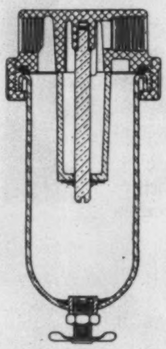
Series 12,200N
¼", ⅜" Pipe Sizes

New Replaceable Bowl Filter

a better low cost filter

Norgren is now manufacturing a new, low cost filter for applications where the removal of solids from the air is of primary importance. The replaceable bowl can easily be removed for cleaning or it can quickly be replaced if accidently damaged in use.

The filter part of the unit, a reinforced 200 mesh Monel wire screen, or sintered metal filters of 64 and 25 microns, is easily removed for cleaning without removing the entire unit from the air line. There are no moving parts to wear out and the filter functions with a minimum of pressure drop.



Series 30AD
¼", ⅜" Pipe Sizes

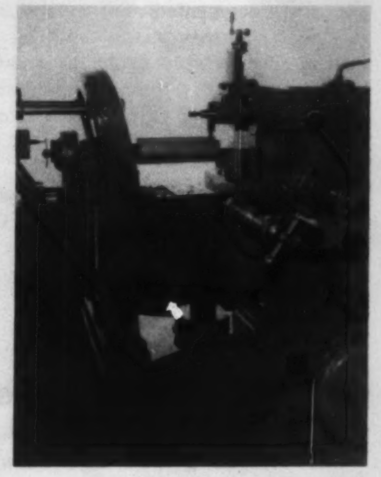
There is a Norgren Air Line Filter for every air line need.

For complete information about Norgren Air Line Filters, phone your nearby Norgren Representative listed in your telephone directory . . . or WRITE FOR NEW NO. 700 CATALOG.

C. A. Norgren Co.
3412 So. Elati, Englewood, Colo.
PRESSURE REGULATORS • AIR LINE FILTERS
LUBRICATORS • AIR CONTROL VALVES

Hydraulic Shaper

A copying shaper is template controlled for machining external contours. It makes splines, contoured punches, externally contoured sections, metal removing electrodes and punches quickly and accurately. Setups are no more complex than those on a conventional shaper.

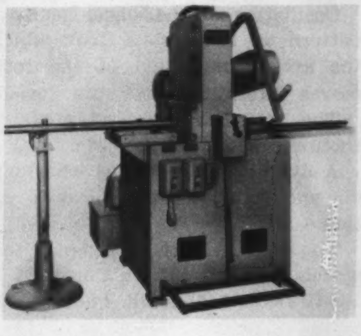


Templates are normally made the same size as the work, but they can be made larger.

Maximum work length is 11 in. The largest diameter piece that can be held is 7 13/16-in. The shaper will make 30, 60, 90 and 180 strokes a minute. *Write*: Haller Inc., 684 Ann Arbor Rd., Plymouth, Mich. *Phone*: 3074

Abrasive Cutting

The Model 64 Cutamatic severs sheets, angles, channels, pipes, tubes, and solids of practically all analyses. Included are hardened and annealed steel, brass, bronze, Monel, aluminum, magnesium,



▲ L-M pond-type chain saws "bucking" log for a veneer plant.

◀ Close-up of MAX-EL alloy steel chain saw bar, showing depth of heat treatment for tougher, longer-lasting bars.

it takes MAX-EL Alloy Steel to take a beating like this

Ram the flying teeth of a chain saw against a heavy log – and watch the sawdust fly! But don't forget – backing up that speeding chain is a bar that has to absorb all the shock . . . yet keep the chain lined up accurately, dependably.

That's a big reason why leading chain saw manufacturers, like L-M Equipment Company, Portland, Oregon, specify Crucible MAX-EL® alloy steel for chain saw bars.

And there are other reasons, too. For MAX-EL is not only tough, wear-resistant and dependable . . . but it also shows outstanding response to heat treatment . . . excellent machinability . . . high uniformity . . . minimum distortion. It's these qualities that permit L-M to machine their saw bars first – *then* give them a graduated heat treatment that insures toughness at the edges . . . flexibility in the main section.

If your product requires a tough, machinable, nondeforming alloy steel – MAX-EL is for you. Try it. To see what information is available on MAX-EL – or *any* Crucible special steel – get your copy of the "Crucible Publication Catalog." Write *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

ROLOCK

FABRICATED ALLOYS

HEAT AND CORROSION RESISTANT

HOURLY COST EVIDENCE PILES UP . . .

it pays **WELL** *to switch to* **NEU-POTS**

ROLOCK'S WELDED-FABRICATED NEUTRAL SALT POTS

Occasional good "case histories" are fine . . . but here we have practically ALL the people who now use NEU-POTS reporting *many* times previous service life. For example:

A screw manufacturer. Operating temperature, 1550° to 1600°, 16 hours per day. Idling temperature, 1350° to 1400°, 8 hours per day. NEU-POT service, *5616 hours* . . . cost, less than 6¢ per hour.

A heat treating and brazing shop. Operating temperature, 1500° to 1550°. NEU-POT service, *3300 hours* with "no end in sight." Cost to date, 13¢ per hour.

A stamping manufacturer. Previous *average* life of pots, 165 hours at a cost of over 54¢ per hour. NEU-POT life on same job, already *over 1000 hours* at average hourly cost of 34½¢.

There are, of course, some very good reasons for such success with NEU-POTS. Rolock methods and skills in welded fabrication of high heat-resistant alloys develop the full advantages of this type of construction, while solving previous tough problems such as joint leakage. Special X-ray inspection procedures on each individual pot before shipment furnish a positive extra safeguard.

Because some neutral salt pot users are hard to convince . . . till they make their own tests . . . we give special attention to *first* orders. Why not send yours in today?

SALES AND SERVICE REPRESENTATIVES FROM COAST TO COAST

ROLOCK INC., 1262 KINGS HIGHWAY, FAIRFIELD, CONN.

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

2RL56

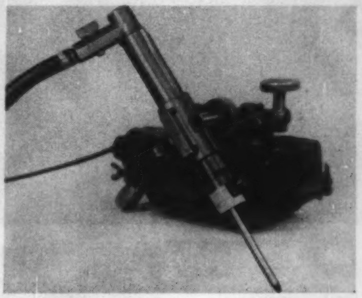
tungsten, tantalum carbide, beryllium, titanium, ceramics, phenolic plastics and glass.

The oscillating wet abrasive cutter will handle solids 3 in. in diameter, tubing 4 in. in diameter and steel plate that is 1 x 6 in. It cuts 1 sq in. in about 4 seconds.

A 10-hp motor drives the cutter through multiple V-belts. *Write*: American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn. *Phone*: Edison 5-0161

Cutting Torch

Model L-3 travels automatically and makes smooth gouges in all metals. Only an electric arc and compressed air are used for cutting, gouging, beveling and grooving.



The unit is held and moved by a machine on a track. Speed of travel can be preset for maximum efficiency. *Write*: Arcair Co., 419 S. Mt. Pleasant St., Lancaster, O. *Phone*: 6068

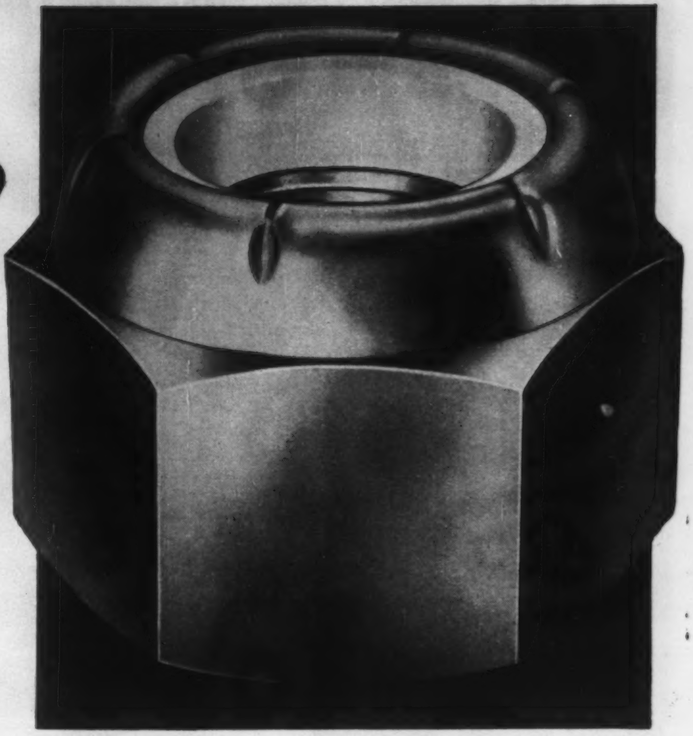
Facing Machine

The Thiel machine produces flat and square surfaces on any workpiece. Workpieces need only one flat surface to be held to the table.

Squaring and clamping blocks, which slide in table keyways, hold the work rigid. A 14-in., cup-shaped grinding wheel mounted perpendicularly to the table runs at 1400 rpm. It faces cold, or hot-rolled steel, tool steels, steel castings and all nonferrous alloys.

Face mills can be substituted for the grinding wheel when great-

What's special about this STOP NUT?

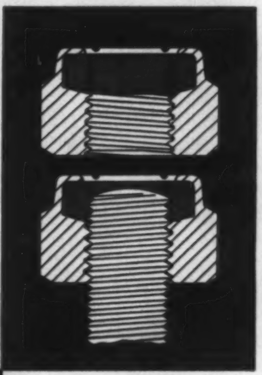


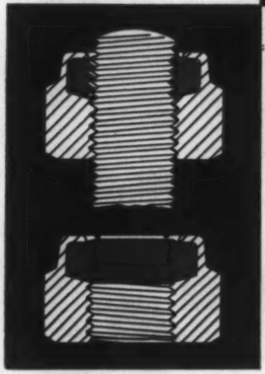
Several things make this nut unusual. For instance, you can "stop" it at any position on the threaded length of the bolt . . . or wrench it tight against the work where it protects bolt threads against corrosion and prevents liquid leakage. No matter where you leave it on the bolt, it will remain tight in that exact position, even though you subject it to heavy vibration and shock loads. But use a wrench on it and it comes off as easily as it went on. The red locking collar is nondestructive—does not gall bolt threads or remove plating. You can remove it and re-use it again and again.

What gives it its grip?

1 The locking collar is unthreaded and elastic. It has an inside diameter smaller than the major diameter of standard bolts.

2 The bolt impresses a mating thread into the collar and the resulting compressive forces exert a constant friction grip on the bolt. . . .





3 and exert a downward thrust bringing the lower flanks of the bolt thread into firm metal to metal contact with the matching nut threads, eliminating normal axial play.

4 Nut is removable and reusable . . . the Red Elastic Collar retains its grip after repeated usage.

Will it hold under ALL conditions?

The locking principle of the Elastic Stop® nut has been tested and proved by over 25 years of actual field service. Elastic Stop nuts are used on locomotives . . . and pile drivers. They fasten hedge shears and harvesters, drilling rigs and washing machines, trucks and roller skates. And no Elastic Stop nut customer has ever stopped using them because of unsatisfactory performance.

What about sizes and materials?

Elastic Stop nuts are available from a watchmaker's 0-80 all the way to 4"—in materials that include stainless steel, brass, aluminum and other alloys. Protect your product with "fastener insurance." Try Elastic Stop nuts on trouble spots, whether to protect expensive heavy equipment from costly downtime or to guarantee the accuracy of delicate electrical equipment by maintaining precision adjustments. We'll supply free test samples.

ESNA® TRADE MARK

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. N82-460, 2330 Vauxhall Road, Union, N. J.
Please send the following free fastening information:

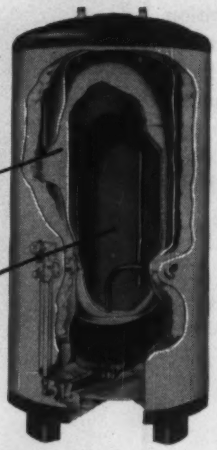
☐ ELASTIC STOP nut bulletin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name________________ Title________
Firm________________
Street________________
City________________ Zone_____ State______

PROOF that SIL-FOS brazing assures long-lasting water-tight joints

For some time now the RHEEM Manufacturing Co. have been using a SIL-FOS low-temperature silver brazing alloy in making a vital part of their revolutionary COPPERMATIC domestic water heaters — *the inner tank of pure copper.* This large tank is made of two identical halves brazed with SIL-FOS 5. The finished tanks are one of the reasons why RHEEM gives a 10-year warranty on COPPERMATICS.

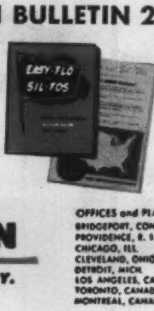


SIL-FOS brazing is fast!

At rear, the copper halves — each with a ⅜" turned-in flange around its edge — are accurately held in a jig and tack-brazed. Then the seam is completed as shown in foreground. Brazing per seam is 80". Two men do it in 1 minute. Inner and outer tank assemblies are hydrostatically pressure-proved at 300 lb. per sq. in.

GET THE CONVINCING SIL-FOS FACTS IN BULLETIN 20

It tells you why SIL-FOS joints are as strong, rustproof and long-lasting as the non-ferrous metals joined – and why SIL-FOS brazing is so fast and economical. Write for a copy today. With it we'll send a list of SIL-FOS Distributors. There's one near you ready to render helpful service.



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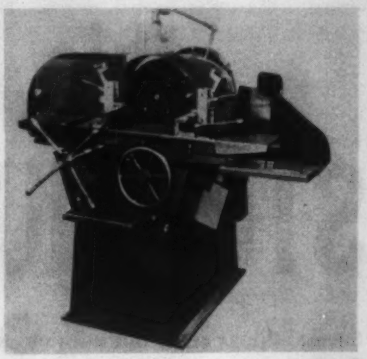
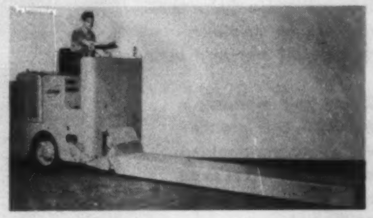


er stock removal is needed. *Write*: Eastown Tool & Engineering Co., 23672 Schoenherr Rd., East Detroit, Mich. *Phone*: Prescott 6-2980

Platform Truck

An electric powered, low lift platform truck permits the operator to sit during handling operations. Controls are almost identical to those on fork trucks.

Capacities of the new models range from 10,000 to 20,000 lb. Platform sizes can be varied to meet specific needs. The truck is equipped with four-wheel steering and a hydraulic platform lift. Power steering is available.



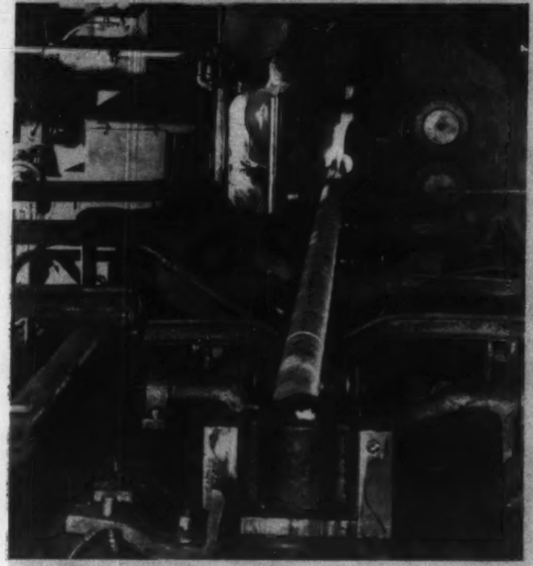
The truck may be powered with a battery, gas-electric or diesel-electric unit. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

Conveyor

The Pickard-Warren conveyor is used to clean flue dirt from the air passes running between open-hearth checkers and stacks.

When the bucket is lowered to the floor of a duct, it lands on steel rollers mounted in aluminum frames. Rollers make it possible to move the bucket rapidly and

Jones & Laughlin UPSETS TUBING ON NATIONAL FORGING MACHINES!



Upsetting tubing on a National Forging Machine at the Jones & Laughlin Aliquippa Works.

Jones and Laughlin Steel Corporation, recognized outstanding experts on upset tubing as well as other forgings, rely upon National Forging Machines for this type of exacting work. At present on the job at the Aliquippa Works of J&L, are National 6″ and 7½″ Forging Machines. Their new 10″ National — the largest size upsetter being built today — will be scheduled to go into production soon.

Here is another example in which industry's leaders and National Machinery "team up" to solve difficult forging problems.

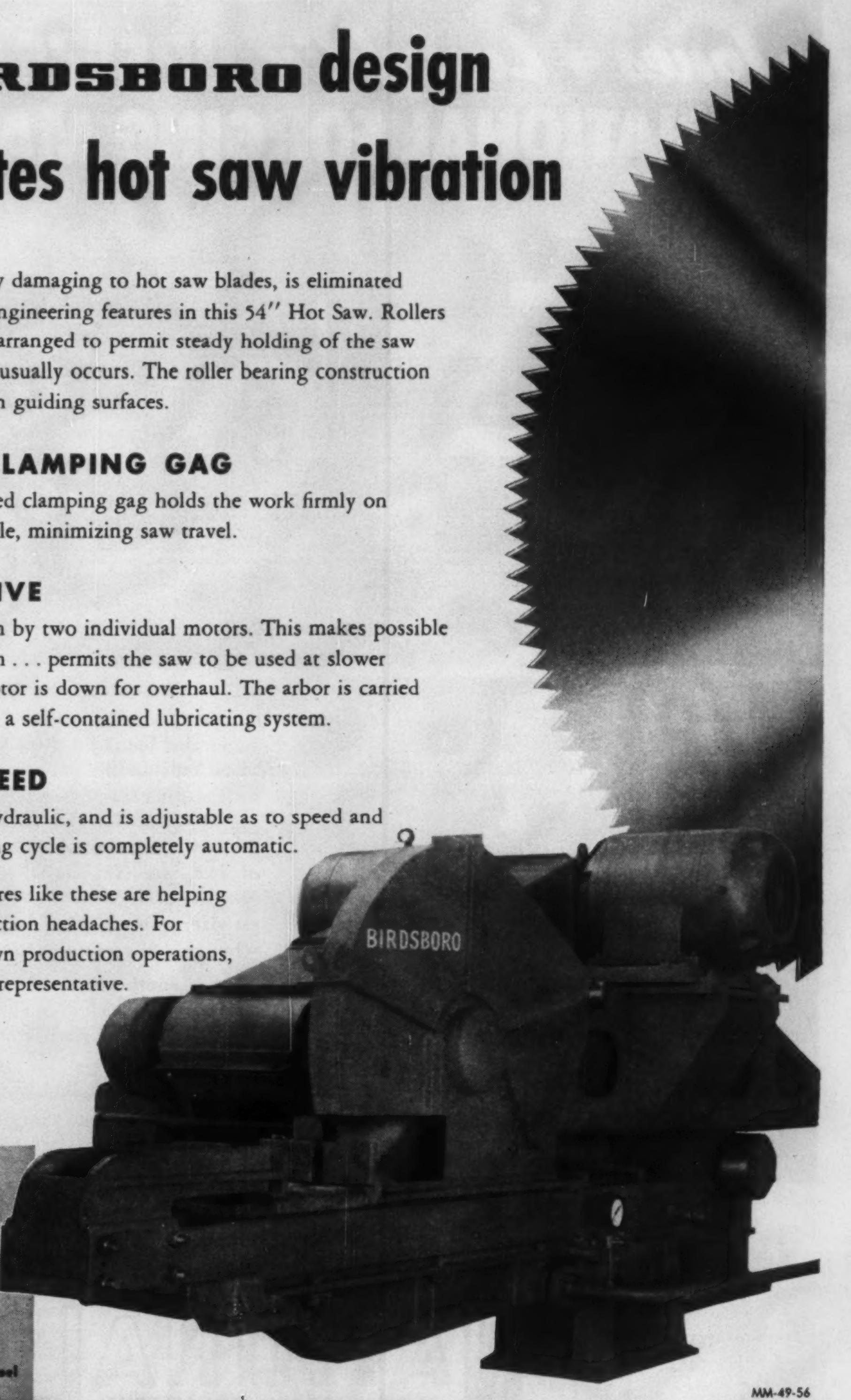
If you have a forging problem—large or small, hot or cold, ferrous or non-ferrous—we invite you to send us your samples or prints. Better yet, pay us a visit. *Let's approach tomorrow's new and better ways of forging metal parts in the light of methods and ideas which our people are already testing today!*

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

New BIRDSBORO design eliminates hot saw vibration



Vibration, often highly damaging to hot saw blades, is eliminated by special Birdsboro engineering features in this 54″ Hot Saw. Rollers under the carriage are arranged to permit steady holding of the saw frame where vibration usually occurs. The roller bearing construction also minimizes wear on guiding surfaces.

HYDRAULIC CLAMPING GAG

A hydraulically operated clamping gag holds the work firmly on the saw side of the table, minimizing saw travel.

2-MOTOR DRIVE

The saw arbor is driven by two individual motors. This makes possible a more balanced design . . . permits the saw to be used at slower cutting rates if one motor is down for overhaul. The arbor is carried on roller bearings with a self-contained lubricating system.

HYDRAULIC FEED

The saw feed is also hydraulic, and is adjustable as to speed and cutting pressure. Sawing cycle is completely automatic.

Birdsboro design features like these are helping other mills ease production headaches. For similar help in your own production operations, call in your Birdsboro representative.

Designers and Builders of:

STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

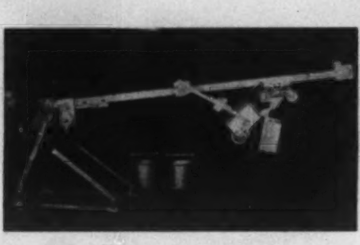
MM-49-56

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

safely in the ducts. Flue dirt can be moved to the double hook from the flue without relaying and multiple handling.

The filled bucket is raised to the trolley by an air motor and carried out the beam and unloaded.



The machine is portable; the boom and folding frame are aluminum and easily disassembled. Three men can disassemble the unit and move it to another furnace in 30 minutes.

The conveyor also is used in cleaning out soaking pits and other deep and remote points. *Write*: Mars Engineering & Fabricating Co., 201 Sunset Dr., Pittsburgh 33, Pa. *Phone*: Valley 4-2657

Carbon-Air Cutting

Carbonaire is a power source for the carbon arc-compressed air method of cutting and gouging all kinds of metals.

At 36 to 54 volts, the machine is rated at 1000 amp on an 85-per-cent duty cycle, 900 amp on a 100-per-cent duty cycle.

Four bus-type cable terminals

BLAZING THE HEAT TREAT TRAIL WITH HOLCROFT

LET'S TALK ABOUT THE NICKEL SHORTAGE

Today's shortage of nickel—caused by government stockpiling—has important repercussions for potential buyers of heat treat furnaces.

Heat-resistant alloys may be used in radiant tubes, rails, and other interior sections of the furnace only when nickel is readily available.

That's why we have developed a furnace to meet this challenge—*one that requires no alloys,* yet will meet all the requirements of trouble-free life, low cost, stepped-up production, and high quality control. This is just another example of Holcroft pioneering in furnace design. Better investigate—right now!

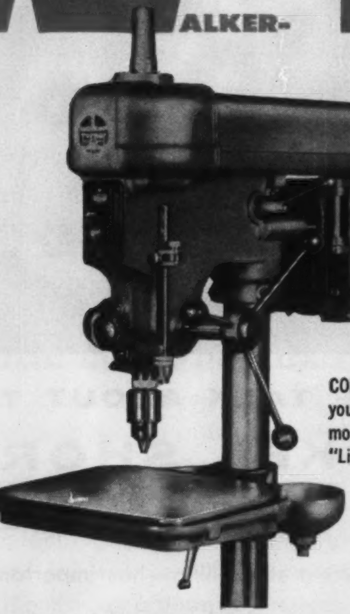
OTHER RECENT HOLCROFT FIRSTS

- 1955—Developed a bantam-sized batch furnace using a minimum of alloys.
- 1954—Developed "Lo-Dew" generator for producing exothermic and endothermic atmospheres.
- 1951—Installed silicon carbide skid rails in conveyorized furnaces.

HOLCROFT AND COMPANY
6545 EPWORTH BOULEVARD • DETROIT 10, MICHIGAN
PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO, ILL. • CLEVELAND, OHIO • DARIEN, CONN. • HOUSTON, TEXAS • LOS ANGELES, CALIF. • PHILADELPHIA, PA.
CANADA: Walker Metal Products, Ltd., Windsor, Ontario

W-T WALKER-TURNER



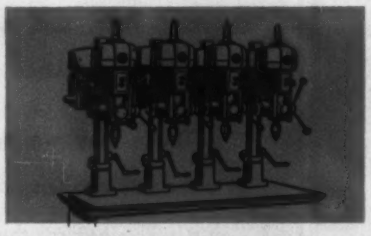
COMPARE — You'll see that you get a lot more for your money when you buy W-T "Light-Heavyweights"!

6" Spindle travel means BIG MACHINE capacity in this 15" Drill Press!

You don't have to go to a 20" or larger drill press to get 6" spindle travel. With this 15" Walker-Turner, you can drill holes up to 6" deep at one pass of the drill, in diameters from #60 to ½".

This extra-capacity "LIGHT-HEAVYWEIGHT" is built to deliver fast, accurate production drilling in your plant, 24 hours a day, for a long span of years.

1300 Series — Walker-Turner "Light-Heavyweight" 15" Drill Press — full 6" spindle travel; six spline, full floating spindle; speeds from 480 to 5000 rpm, depending on motor and pulleys; Jacobs Chuck, or No. 1 Morse taper available. (15" Walker-Turner "LIGHT-HEAVYWEIGHT" Drill Press with 4" spindle travel — 1200 series — also available.)



Ask your Walker-Turner Distributor to *demonstrate* the big capacity of this 15" W-T Drill Press. He's listed under "Tools" in your phone book's Yellow Pages. Or write for his name and full specifications on these machines.

DRILL PRESSES, HAND AND POWER FEED — AIR FEED DRILL PRESS ATTACHMENTS
RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS
RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS
JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES

walker-Turner

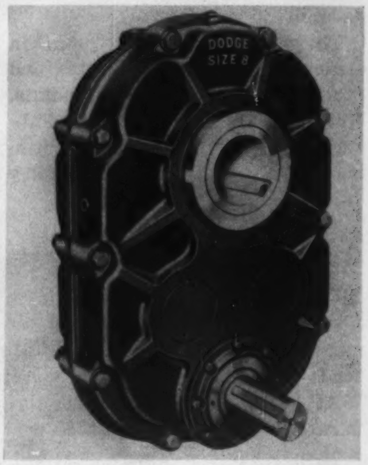
WALKER-TURNER
Division
Kearney And Trecker Corporation • Plainfield, N. J.

provide one negative and three positive current ranges. The cutting torch cable is attached to low, medium or high current to suit the job. A handwheel adjusts the arc voltage to the desired value. *Write*: Hobart Bros. Co., Hobart Square, Troy, O. *Phone*: 2-1223

Speed Reducers

The Torque-Arm line includes shaft-mounted speed reducers with capacities from 1 to 60 hp and output speeds from 12 to 365 rpm.

The reducers need no foundation, flexible couplings or sliding bases. There are no lining up difficulties. The reducers are mounted on the shaft, and the Torque-Arm is fastened to any fixed object to anchor the reducer.



A V-belt drives the unit. Taper-Lock sheaves permit any speed ratio desired. *Write*: Dodge Mfg. Corp., Mishawaka, Ind. *Phone*: 9-2421

Double-End Grinder

Each side of this unit operates independently. A safety interlock maintains exactly 9000 sfpm throughout wheel life.

Large diameter wheels cannot be mounted until the speed has been lowered in relation to the wheel diameter.

There are three sizes: Two 7½-hp or two 10-hp motors operate wheels 24 in. in diameter; two 10-hp motors run wheels 30

second in a series . . . **CHEMICAL STABILITY**

Comparative stability of MONOFRAX® fused cast refractory (left) vs. fireclay (right) . . . under attack by molten glass, as viewed through the high temperature microscope — one of Carborundum's most useful test facilities. (16 mm. frames shown are not consecutive.)

Unusual Properties of Refractory Materials

Chemical stability — Even under high temperature attack by gases, acids, corrosive solutions, molten salts and molten metals — the chemical stability of CARBORUNDUM'S super refractories enables them to fill industrial requirements that other refractories are unable to meet. For this reason, they are being used with increasing frequency in critical applications: i.e. as linings in controlled-atmosphere furnaces, in the production of muriatic acid, as radiant tubes, in the submerged combustion of liquids containing free acid — such as mixed chlorides and sulphates of iron, zinc, mercury and tin; in retorts for reducing and refining zinc, melting copper alloys and for hundreds of similar applications.

CARBORUNDUM'S laboratories are constantly developing new super refractories to meet specialized application problems. Current research projects include refractory materials for guided missile components, for atomic reactors, and for applications where wear and corrosion are unusually severe.

The forthcoming issue of CARBORUNDUM'S new magazine "Refractories" treats the subject "Chemical Stability of Refractories" in detail. Send for your copy today.

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The Carborundum Company, Perth Amboy, N. J.
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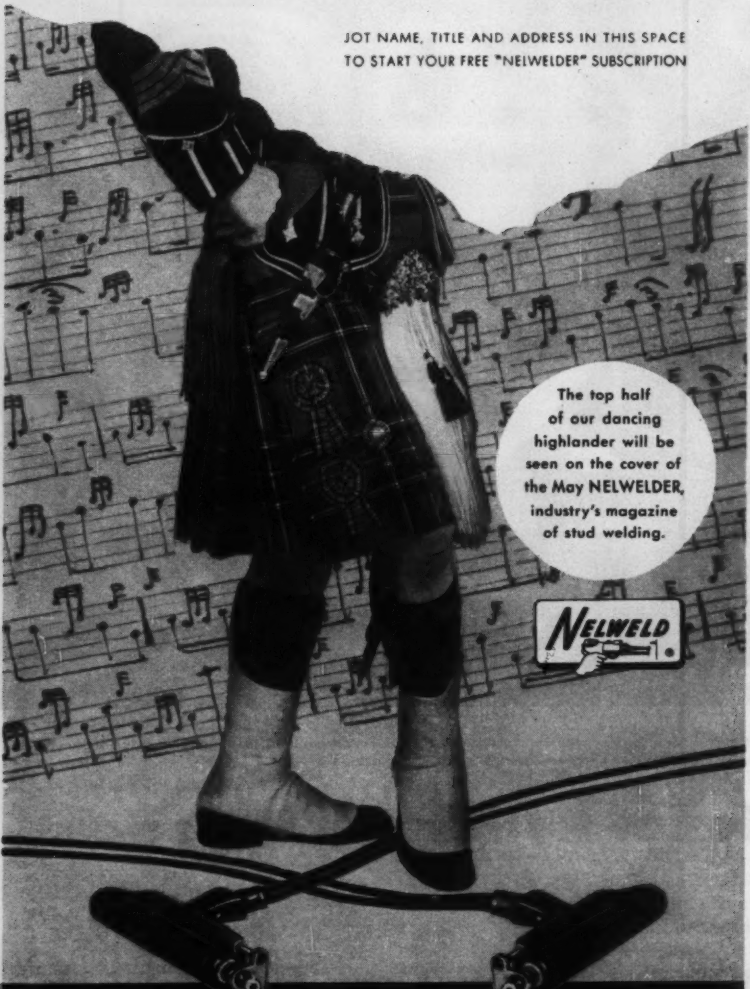

The top half of our dancing highlander will be seen on the cover of the May NELWELDER, industry's magazine of stud welding.

another way of saying..

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You'll dance with glee when you see how thrifty it is to end-weld fasteners and projections the NELWELD® way. Cost-conscious engineers who specify this method save material, handling time, reduce drilling, and eliminate tapping. In construction, it's a money saver, too.

The best of the thrift stories are told monthly in the NELWELDER. Perhaps some of them will spark a bonnie short cut for you! The top of this advertisement is your subscription blank.

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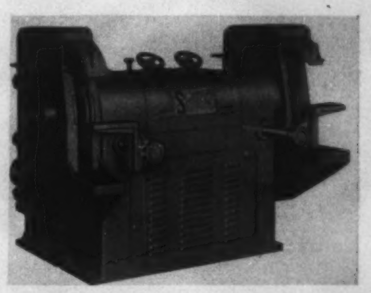
Division of Gregory Industries, Inc.
LORAIN, OHIO



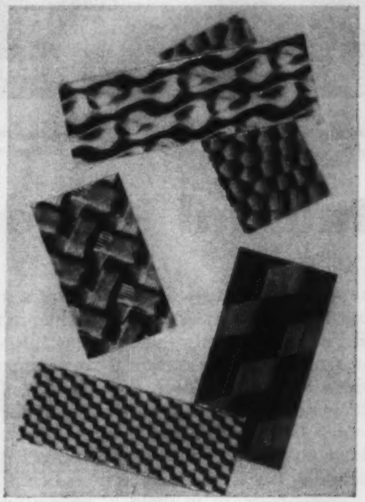
in. in diameter. *Write*: Foundry Grinder Division, Standard Electrical Tool Co., 2488 River Road, Cincinnati 4, O. *Phone*: Grandview 1-6200

Metal Patterns

Shadow box patterns are recommended for dial plates, auto interiors, gift items and appliances.

A basket weave pattern is suggested when a bold texture is desired. It can be furnished perforated for radio and TV speakers.

A small hammered pattern can be used on hardware or lighting fixtures.

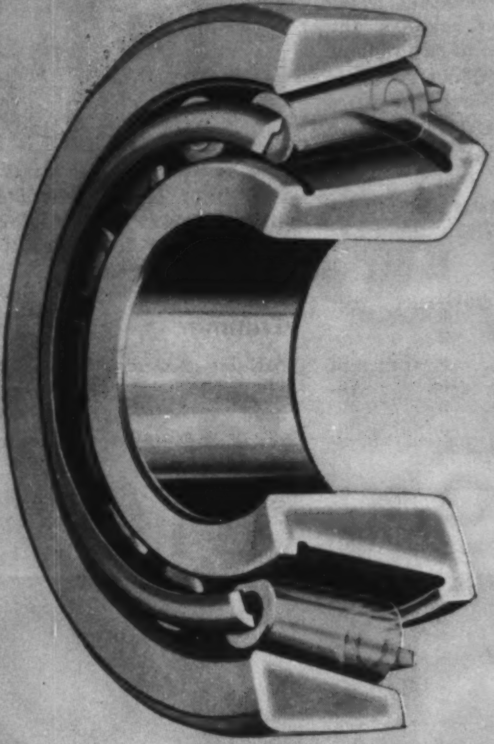


All patterns are produced in a variety of metals, finishes and colors. *Write*: Rigidized Metals Corp., 684 Ohio St., Buffalo 3, N. Y. *Phone*: Madison 6162

Arc Welding

A glass cup for Heliarc HW-17 torches eliminates blind spots. The welder can see the puddle

There's a BOWER TAPERED ROLLER BEARING engineered to fit *your* product



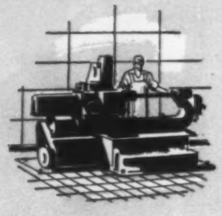
Types and sizes to fit a wide range of tapered bearing applications

There's no need to compromise with bearings! Whatever your product, if it uses tapered roller bearings, call in a Bower engineer for expert help on selecting the exact type and size you need.

Depending on your own particular needs, he'll make sure you get the exact size and type—selected from Bower's complete tapered line—engineered to assure maximum performance in your application.

Most important of all, when you specify Bower tapered roller bearings for your product, you get all the advantages of advanced Spher-O-Honed design—less maintenance, longer life, smoother operation. Get the full facts on the *complete* Bower line.

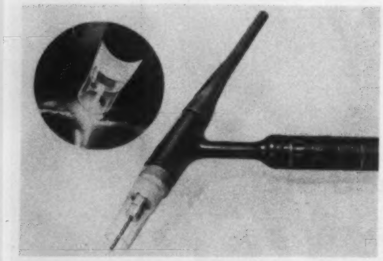
Tapered, Straight and Journal Roller Bearings for every field of transportation and industry



SPHER HONED BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION • FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICH.

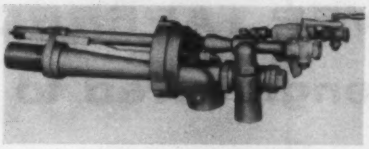
through as well as below the cup that conveys the inert shielding gas to the welding zone.



The No. 7 glass cup and its ceramic adaptor are attached to a torch in the same way as a conventional ceramic cup. *Write*: Linde Air Products Co., a division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 7-8000

Radiant Tube Burners

Used with radiant heating tubes in industrial furnaces and ovens these burners assure quiet operation and uniform heating. They operate on about 8 oz air pressure and low pressure gas, normally below ½-lb.



An external adjustment varies the amount of primary air.

By using adapter castings, the burners can be used to fire radiant tubes with outside diameters from 3¾ to 8¼-in. The burners will fire from 250,000 to 400,000 Btu an hour when operating on 8 oz of air. *Write*: Eclipse Fuel Engineering Co., 1002 Buchanan St., Rockford, Ill. *Phone*: 8-3751

Construction Fastener

Setlock fasteners speed assembly and improve the appearance of insulated metal sandwich and other curtain walls.

The system uses a steel, shoulder-type stud with a serrated tip, which is end welded to structural girts with a stud welding gun.

An aluminum cap is placed over the serrated tip of the stud and is driven into position with a tool which causes the aluminum to flow into and grip the serration. Holding power is more than 800 lb. *Write*: Nelson Stud Welding Division, Gregory Industries Inc., Lorain, O. *Phone*: 56-931

Trimmer

Bulky material can be inserted easily because the air-operated head can be raised 2 in. The foot pedal makes it possible to raise

Here is an IMPORTANT conveyor message for the metalworking industry

Write today for complete information.

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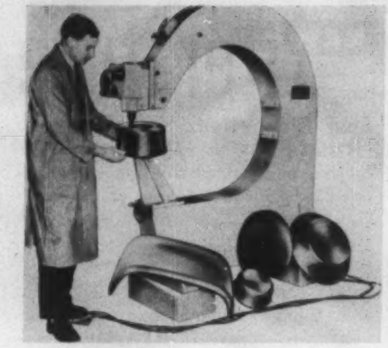
ENGINEERING, INC.
1725 Clarkstone Road Cleveland 12, Ohio



and lower the head while both hands hold the workpiece.

Guide bars aid in shaping large metal pieces. They can be removed when edge trimming a large stamping, center cutting a deep drawn stamping and for other uses. *Write*: American Pullmax Co. Inc., 2455 N. Sheffield Ave., Chicago 14, Ill. *Phone*: Diversey 8-5727

Electric Truck

The JackLift moves bulky loads which rest on the floor and do not have pallets or dunnage.

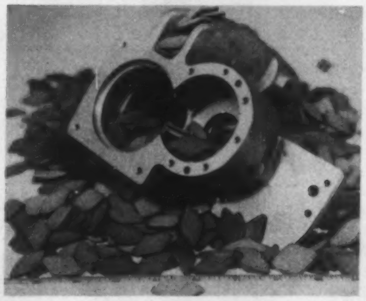
Lifting arms straddle the load, which is picked up with retractable fingers. The fingers are hydraulically operated from the operator's position.

The lifting arms are 57-in. wide and 84-in. long. Open end clearance between them is 29½-in. The 16,000-lb capacity truck has a lift of 4 in. *Write*: Dept. R-14, Lewis-Shepard Products Inc., Watertown, Mass. *Phone*: 4-5400

Abrasive

Speed-D-Burretts are an abrasive for precision barrel finishing. Size, shape and grit are controlled.

They are made by kneading pure aluminum oxide grains or grit into raw rubber. The material is molded, formed or rolled to shape and cured to precise hardness. The abrasives are long lasting and can be used in any make of barrel finishing equipment. *Write*: Speed-D-Burr Corp., 3613 San Fernando Rd., Glendale, Calif. *Phone*: Chapman 5-2468



Space Heater

The direct-fired space heater has a single switch to change over from oil to gas. It is made in eight sizes (from 400,000 to 2 million Btu an hour).

The unit heats in winter, ventilates in summer. Its electronic combustion control system is fully automatic. The rolled-shaped stainless steel combustion chamber gives long life and silent operation. *Write*: Airtherm Mfg. Co., 700 S. Spring, St. Louis 10, Mo. *Phone*: Mohawk 4-6666

NOW YOU CAN ASSEMBLE YOUR OWN "CUSTOMIZED" CONVEYORS FROM PRE-FABRICATED STANDARD SECTIONS.

If your plant produces stampings, formed metal parts, castings or forgings . . . if you have a byproduct such as automotive scrap, chips and turnings . . . the MAY-FRAN conveyor standardization program will provide your company with savings never before possible.

Through standardization, MAY-FRAN now makes it possible to assemble individual components into virtually any type of conveyor to handle a wide range of products or materials. Straight sections . . . concave or convex sections . . . take-up charge sections and discharge-end sections can be furnished to meet specific requirements of belt width as well as load bearing and volume capacities.

Even after they are installed, MAY-FRAN conveyors can be dis-assembled and re-assembled in other plant locations . . . to handle other products. Standardized conveyors can be lengthened, shortened or modified in almost any way . . . and at minimum cost.

Pre-fabricated conveyor sections can be furnished rapidly and inexpensively. The individual components provide users with the ultimate in flexibility. MAY-FRAN hinged-steel conveyor belting is used on the Standardized units. Belting is available in widths from 6 inches to 6 feet in any length. Solid and perforated links are available in pitch lengths from 2½ to 9 inches.

MAY-FRAN . . . a name long recognized in the materials handling field . . . is first again with standardized components for your customized installations.

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My tension mounted... I was pulled this way and that!
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Analyzing metal problems and prescribing cures is a job for specialists. Riverside metallurgists *are* specialists. They have the solution to almost any non-ferrous alloy problem you can name—whether it's tension or temper, fatigue resistance or surface finish.

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NEW Literature

Rust Prevention

Catalog 255, 28 pages, gives information on rust prevention in industry. It includes 102 color chips. Rust-Oleum Corp., 2799 Oakton St., Evanston, Ill.

Precision Casting

A 4-page folder presents the advantages of investment casting. Arwood Precision Casting Corp., 56 Washington St., Brooklyn 1, N. Y.

Surface Measurement

An 8-page bulletin describes the terms and tools used in roughness measurement. Micrometrical Mfg. Co., 345 S. Main St., Ann Arbor, Mich.

Soldering Chart

Melting points of a line of solder alloys and their uses are listed in a chart. Anchor Metal Co. Inc., 244 Boerum St., Brooklyn 6, N. Y.

Aircraft Bearings

This 4-page bulletin presents a new series of rod end control bearings for aircraft. Fafnir Bearing Co., New Britain, Conn.

Rivets

A 28-page catalog on small rivets and culvert rivets gives information on plating, dimensions and kegging. Brainard Rivet Co., Girard, O.

Architectural Aluminum

A specification booklet covers properties, forms and matching of alloys for best appearance. Room 775, Alcoa Bldg., Aluminum Co. of America, Pittsburgh 19, Pa.

Heat Treating

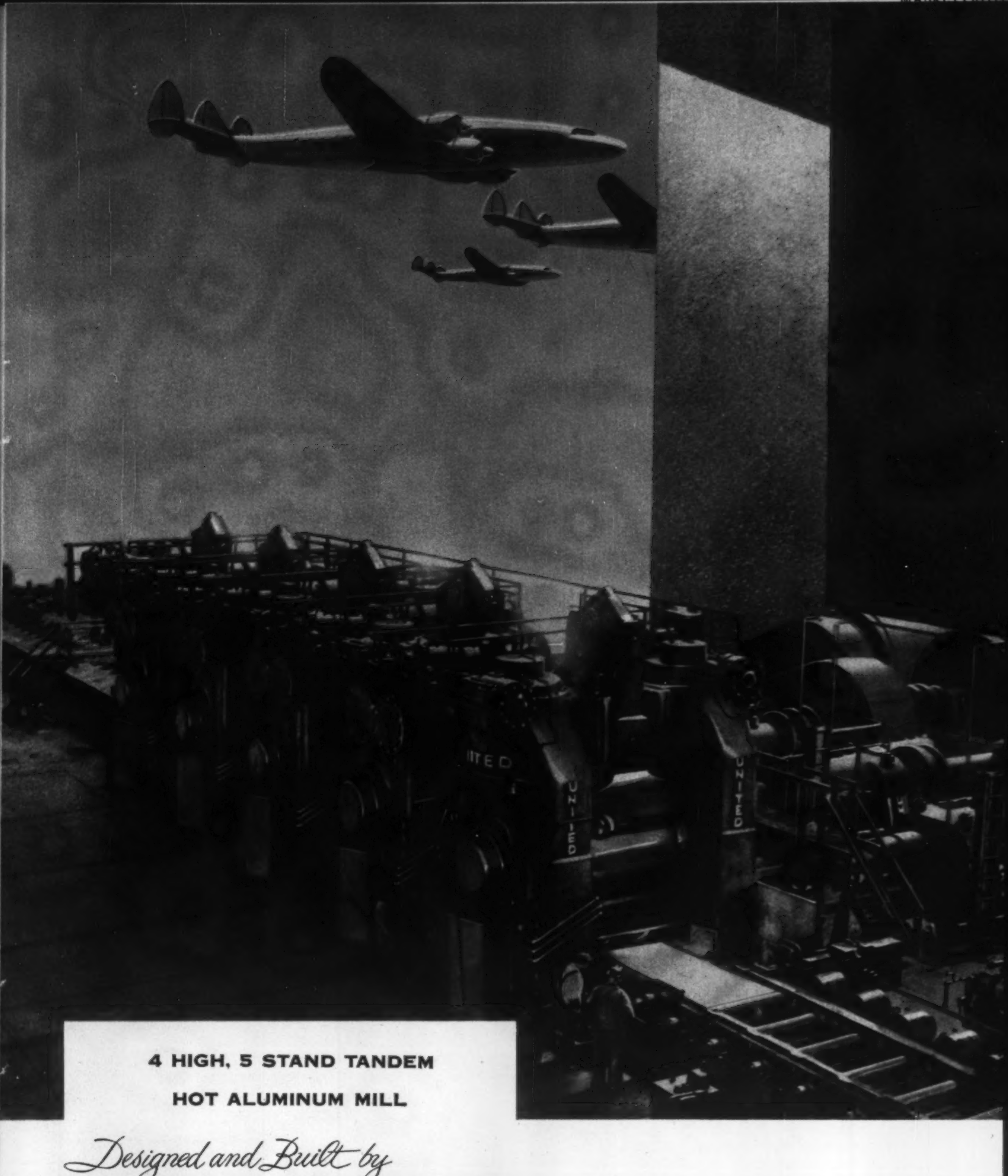
A reference sheet on heat treating services gives tips on ordering and specifying processes. Metal Treating Institute, 271 North Ave., New Rochelle, N. Y.

Cemented Carbides

All styles of standard blanks, rectangular strips, pulley grooving and stone chisel blanks and throwaway inserts are covered in catalog 2, 18 pages. Firth-Loach Metals Inc., Buttermilk Hollow Road, McKeesport, Pa.

Sandblasting

Machines for cleaning, deburring, surface preparation, stenciling and matte finishing are described in 4-page bulletin 1256. Leiman Bros. Inc., 102 Christie St., Newark 5, N. J.



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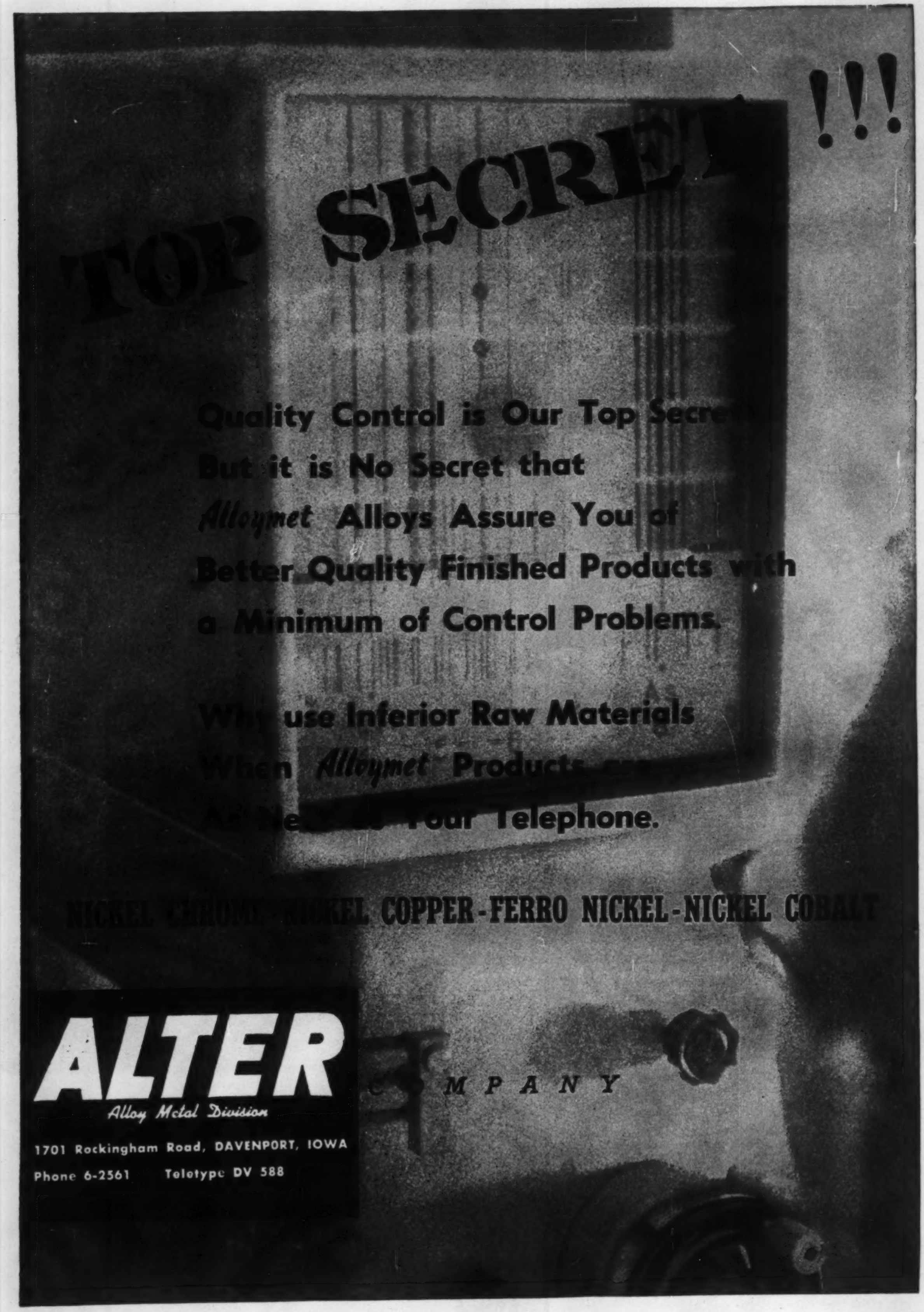

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STEEL

April 9, 1956

Market Outlook

DEMAND for major steel products has eased in some cases, but it still exceeds over-all supply.

The only major consuming group that lessened its pressure for supplies was the automobile industry, and it is showing revived interest.

SPOTTY—The supply situation is not uniform. Some consumers have ample stocks of steel, and others are trying frantically to pick up any available tonnage. A midwest producer of steel tubing is loaded with strip (the raw material for the tubing) and is canceling some grades of material on order.

PINCHED—Most tightly pinched for steel is the West Coast. Consumers there are telephoning into the New England area in quest of steel (particularly cold-rolled sheets) that might be available following reports of a slowdown of consumption in the Northeast.

The West Coast expects steel demand there to be even stronger this year than it was last year. That area is not significantly affected by changes in auto production. Only about 2 per cent of steel receipts in the Far West last year went to the auto industry.

DESPERATE—Elsewhere in the nation, there are instances where the construction industry will pay almost any price to get enough steel to finish a project.

Canmakers are pressing mills for all the tin plate they can get before its price goes up on Apr. 30.

Hot-rolled carbon bars are in easier demand than they were, but producers of them still are booked full for this quarter.

John L. Neudoerfer, president of Wheeling Steel Corp., Wheeling, W. Va., says his company is "pretty well loaded with orders for the second quarter, and, barring some unforeseen upset in the total economy, the third and fourth quarters should be substantially the same."

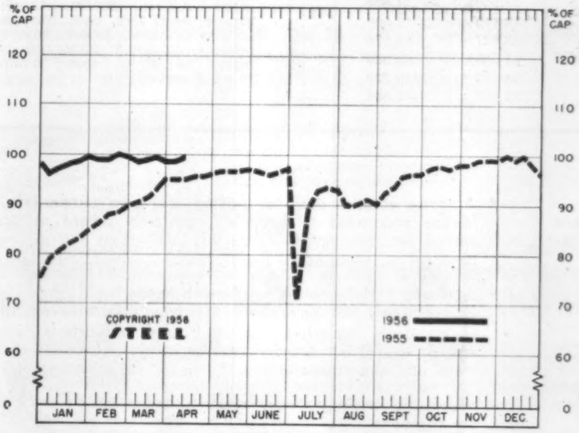
OPTIMISTIC—Also counting on heavy production of steel this year are the suppliers of scrap. Edwin C. Barringer, executive vice president of the Institute of Scrap Iron & Steel Inc., says: "There is every indication that the generation of purchased scrap this year will easily top 40 million tons—20 per cent over the previous record." If steel users generate that much scrap, they will need a lot of steel.

AT 99.5 PER CENT—Steelmakers continue to produce at virtual capacity. In the week ended Apr. 8, they turned out steel for ingots and castings at 99.5 per cent of capacity. This is an increase of half a point over the preceding week. Output in some of the districts is restricted by furnace repairs necessitated by the high rate of operations. The national rate of steelmaking has been above 95 per cent of capacity all this year.

ANOTHER RECORD—Momentum of the sharp upswing in prices of steelmaking scrap carried STEEL's scrap price composite to another new high, $54.17 a gross ton, in the week ended Apr. 4. The previous record was the preceding week's $53.50. Consumer demand for scrap was dampened, though, by the higher prices.

Despite a strong urge to raise steel prices, they were steady in the week ended Apr. 4. This kept STEEL's price composite on finished steel at $128.02 a net ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Apr. 8	Change	Same Week 1955	Same Week 1954
Pittsburgh	101.5	— 1.5*	96.5	71
Chicago	99.5	+ 2.0*	98.5	74.5
Mid-Atlantic	98.0	0	95	62
Youngstown	103.0	+ 9.0	96	69
Wheeling	96.5	— 1.5	92.5	74.5
Cleveland	93.0	— 1.0*	102.5	67
Buffalo	105.0	0	104.5	67.5
Birmingham	93.2	0	87.5	77
New England	85.0	— 1.0	82	51
Cincinnati	89.0	— 4.0	91.5	69
St. Louis	95.0	— 5.0	95	62.5
Detroit	102.0	0	92	66
Western	104.0	+ 1.0	97	77
National Rate	99.5	+ 1.0	95	68

INGOT PRODUCTION‡

	Week Ended Apr. 8	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	151.8	152.6	153.3	143.2
NET TONS (In thousands)	2,439	2,452	2,462	2,300

---

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Apr. 3 1956	Mar. 27 1956	Month Ago	Mar. Average
(1947-1949=100)	157.1	157.1	157.1	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 3

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1...	$4.800
Rails, Light, 40 lb	6.217
Tie Plates	5.625
Axles, Railway	8.350
Wheels, Freight Car, 33 in. (per wheel)	52.50
Plates, Carbon	5.200
Structural Shapes	4.867
Bars, Tool Steel, Carbon (lb)	0.460
Bars, Tool Steel Alloy, Oil Hardening Die (lb) ...	0.560
Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680
Bars, H.R., Alloy	9.425
Bars, H.R., Stainless, 303 (lb)	0.450
Bars, H.R., Carbon	5.500
Bars, Reinforcing	5.313
Bars, C.F., Carbon	8.800
Bars, C.F., Alloy	12.275
Bars, C.F., Stainless, 302 (lb)	0.475
Sheets, H.R., Carbon ...	5.345
Sheets, C.R., Carbon	6.214
Sheets, Galvanized	7.770
Sheets, C.R., Stainless 302 (lb)	0.588
Sheets, Electrical	$10.175
Strip, C.R., Carbon	8.243
Strip, C.R., Stainless, 403 (lb)	0.444
Strip, H.R., Carbon	5.606
Pipe, Black, Buttweld (100 ft)	16.997
Pipe, Galv., Buttweld (100 ft)	21.137
Pipe, Line (100 ft)	167.250
Casing, Oil Well, Carbon (100 ft)	165.120
Casing, Oil Well, Alloy (100 ft)	244.670
Tubes, Boiler (100 ft) ...	39.470
Tubing, Mechanical, Carbon	21.133
Tubing, Mechanical Stainless, 304 (100 ft)	178.897
Tin plate, Hot-dipped, 1.25 lb	8.933
Tin Plate, Electrolytic, 0.25 lb	7.633
Black Plate, Canmaking Quality	6.733
Wire, Drawn, Carbon ...	8.575
Wire, Drawn, Stainless 430 (lb)	0.590
Bale ties (bundle)	6.537
Nails, Wire, 8d Common.	8.603
Wire, Barbed (80-rod spool)	7.847
Woven Wire Fence (20-rod roll)	18.625

STEEL's FINISHED STEEL PRICE INDEX*

	Apr. 4 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)...	209.10	209.10	209.10	194.53	171.92
Index in cents per lb	5.665	5.665	5.665	5.270	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.02	$128.02	$128.02	$118.40	$106.32
No. 2 Fdry Pig Iron, GT..	60.06	59.74	58.99	56.54	52.54
Basic Pig Iron, GT	59.61	59.05	58.49	56.04	52.16
Malleable Pig Iron, GT ...	61.06	60.63	59.77	57.27	53.27
Steelmaking Scrap, GT	54.17	53.50	48.50	37.41	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 4 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.90	4.55	4.18
Bars. C.F., Pittsburgh	6.25*	6.25*	6.25*	5.40	4.55
Shapes, Std., Pittsburgh....	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia..	5.00	5.00	4.88	4.53	3.90
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	4.15
Sheets, H.R., Pittsburgh ...	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh ...	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit...	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.55
Sheets, Galv., Pittsburgh ...	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.35
Strip. C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	5.85	4.90
Strip C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	5.75	4.85-5.10
Nails. Wire, Pittsburgh....	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL

Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$" Pitts.....	5.375	5.375	5.375	4.675	4.10-4.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$61.00	$59.50	$59.50	$57.00	$53.00
Basic Valley	60.00	58.50	58.50	56.00	52.00
Basic, deld. Phila.	63.76	63.76	62.16	59.66	56.39
No. 2 Fdry, Pitts.	60.50	60.50	59.00	56.50	52.50
No. 2 Fdry, Chicago	60.50	60.50	59.00	56.50	52.50
No. 2 Fdry, Valley	60.50	60.50	59.00	56.50	52.50
No. 2 Fdry, deld. Phila. ..	64.26	64.26	62.66	55.16	56.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.58
Malleable, Valley	60.50	60.50	59.00	56.50	52.50
Malleable, Chicago	60.50	59.75	59.00	56.50	52.50
Ferromanganese, Duquesne.	215.00†	205.00†	205.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts...	$54.50	$53.50	$48.50	$38.50	$45.00
No. 1 Heavy Melt, E. Pa..	53.50	53.50	50.00	37.75	43.50
No. 1 Heavy Melt, Chicago	54.50	53.50	47.00	36.00	43.50
No. 1 Heavy Melt, Valley..	58.50	57.50	52.50	37.50	45.00
No. 1 Heavy Melt, Cleve...	56.00	54.50	49.50	35.00	44.00
No. 1 Heavy Melt, Buffalo.	52.50	50.50	46.50	32.50	44.00
Rails, Rerolling, Chicago ..	72.50	72.50	65.50	52.50	52.50
No. 1 Cast, Chicago	51.50	48.50	46.50	41.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl. ..	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connlsvl. ..	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	27.00	27.00	27.00	24.50	21.00

Daily Nonferrous Price Record

	Price Mar. 28	Last Change	Previous Price	Feb. Avg.	Jan. Avg.	Mar. 1955 Avg.
Copper	46.00–51.00	Mar. 31, 1956	46.00–50.50	48.076	46.700	33.222
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.960	14.800
Zinc	13.50	Jan. 6, 1956	13.00	13.500	13.440	11.500
Tin	100.00	Apr. 3, 1956	100.50	100.908	105.067	91.176
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum ..	25.90	Mar. 29, 1956	24.40–25.90	24.400	24.400	23.200
Magnesium .	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.556

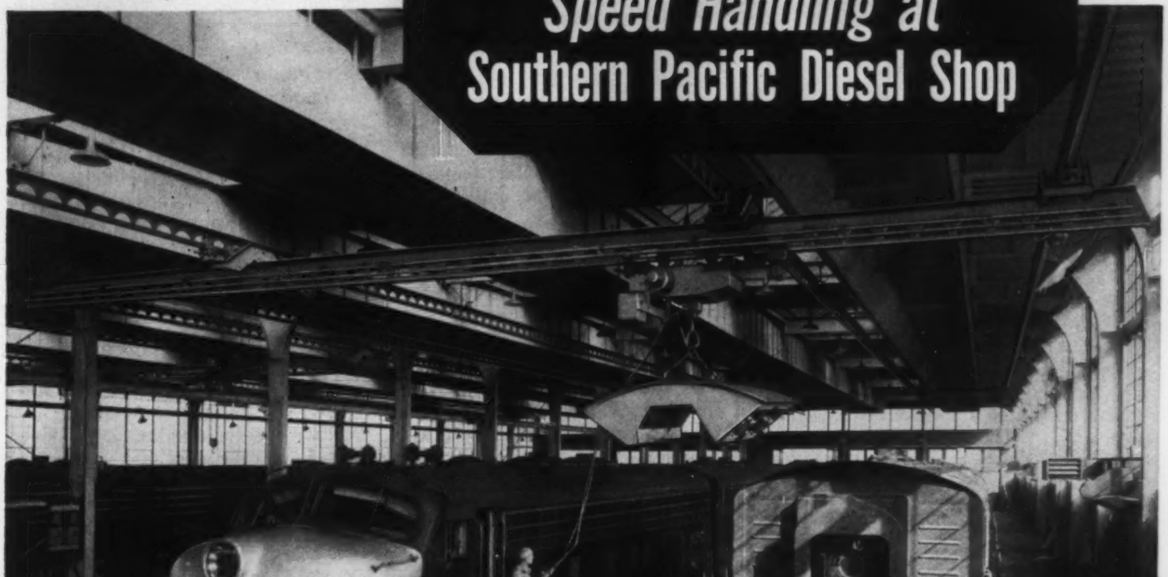
Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

Illustrated is one of the cranes lowering a dynamic brake grid hatch onto a locomotive. As a safety measure, Cleveland Tramrail SAF-POWR-BAR electrification is used throughout.

5 Ton Cranes *Speed Handling at* Southern Pacific Diesel Shop



Approximately 200 Diesel Freight Locomotive units are serviced at the large, modern shop of the Southern Pacific Railway, Roseville, California. Playing an important part in this operation is the Cleveland Tramrail overhead crane system which provides handling service for the entire plant.

There are two 5-ton 62'-10" long cranes operating in two bays, each of which has four crane runway tracks. The tracks are not spaced equally but are arranged to fit between air ducts and ventilating equipment in the ceiling to obtain maximum crane lift. The use of Tramrail multi-runway cranes made possible the construction of a lower height building than would have been required with top-running type cranes.

The cranes are powered by tractor units attached to each crane truck. These powerful drives provide smooth acceleration and are easy to remove and maintain. The cranes are floor operated and push-button controlled. The ease with which parts are spotted into exact position makes the crane a tremendous asset when overhauling locomotives.

This shop is the service center for an area extending from Portland, Oregon, to Fresno, California, and from the Pacific to Sparks, Nevada. It is in operation 24 hours a day, 7 days a week.

Cleveland Tramrail
Engineering and Application Data

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THE CLEVELAND CRANE & ENGINEERING CO.
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CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Nonferrous Metals

ODM defers an additional 1 million lb of nickel to help nondefense users. Industry observers feel that the military still may be first in line

Nonferrous Metal Prices, Pages 166 & 167

IN A SURPRISE move, the Office of Defense Mobilization ordered the diversion of an additional 1 million lb of nickel from stockpile during the second quarter. This brings the total to be released to industry to 20.5 million lb. ODM officials report that the move was made to make more nickel available to nondefense users. They admit that a lion's share of the metal will go to defense-rated orders.

Industry Reaction—Some observers report that it may be a step in the right direction. Others contend that the military machine is taking more and more nickel and that ODM's move was to satisfy it.

There is a growing feeling that the overhungry military machine may cause a continuing shortage even though stockpile goals may be reached sometime in 1958. If needs of the armed forces continue to expand, there would be little metal for nondefense users in '58. Rumors are becoming more persistent that the ODM will see the need for developing new ore fields and a secondary source of supply as soon as possible.

Aluminum Gets Price Reaction

Some independent aluminum extruders are grumbling about the latest aluminum price hike (primary ingot went up to 25.90 cents per pound). They report that they are being caught in the middle and that it will be impossible for them to pass along the increase to customers.

Even extruders will have to admit (some already have) that primary aluminum producers must have expansion capital. Primary aluminum makers point out that the recent increase will help keep the price of the lightweight metal relatively low. Reason: The move will help bring in new facilities; and an abundant supply means low prices.

Reynolds Metals Co. is estimating that 1957 cars will use between 42 and 45 lb (average) of the white metal. This compares with an average of about 33 lb on '56 models. Causes for the increase: More aluminum grilles, trim moldings, emblems and window frames. "With the conversion of the last automatic transmission to aluminum," says David P. Reynolds, vice president in charge of sales, "cast aluminum requirements are expected to increase about 20 per cent."

Aluminum companies are banking heavily on the future. Says one observer: "It is possible that we may have aluminum coming out of our ears in the next few years, but we feel that we can go right on developing new and bigger markets." The current short supply may be helped by the Canadian thaw which will allow Aluminium Ltd. to announce that its curtailed production (caused by drouth) has come to an end.

Lead and Zinc Sales Mixed

There were several heavy sales days for lead and zinc last week, but there is little doubt that large quantities are available for the asking. It is quite possible that the government, which is buying lead and zinc for stockpile, may receive more than token offers this month. But there is little cause for alarm.

One primary producer reports: "Sales are still above last year's totals. Special high grade zinc sales are still weak, but our inventories on all grades of lead and zinc are still low." A spot check of producers reveals that Detroit has not started ordering for motordom's spring rush. "It may take two or three more weeks," reports one producer.

Copper: Pressure Mounts

Under the Chilean tax laws, Anaconda Co. and Kennecott Copper Corp. pay a fixed income tax of 50 per cent, plus a sliding surtax. This means that an increase of 1 cent a pound in the price of copper will bring the Chilean government an additional $6 million (based on a production year of 400,000 net tons).

While Chile has brought pressure to bear, forcing both companies to quote its Chilean production on a basis of the London Metal Exchange, the plan to make more money could backfire in the future. The recent sag in the London price quotation brings to mind that just a little over a year ago Chile was demanding that the U. S. companies establish a floor for the red metal. If the London market takes a serious dip, the American companies could hold to their ground and continue to quote the LME price.

Chile always will hold the upper hand, but the irony of the situation mounts as constantly changing world conditions affect Chile's viewpoint from month to month. Anaconda and Kennecott have announced different pricing plans for their Chilean ore production. They differ only in format. Likely result: The price for Chilean copper in the U. S. will be about 1 cent a pound less than the daily quotations of the LME. There will be ups and downs, but look for a general softening in copper demand for the next two months.

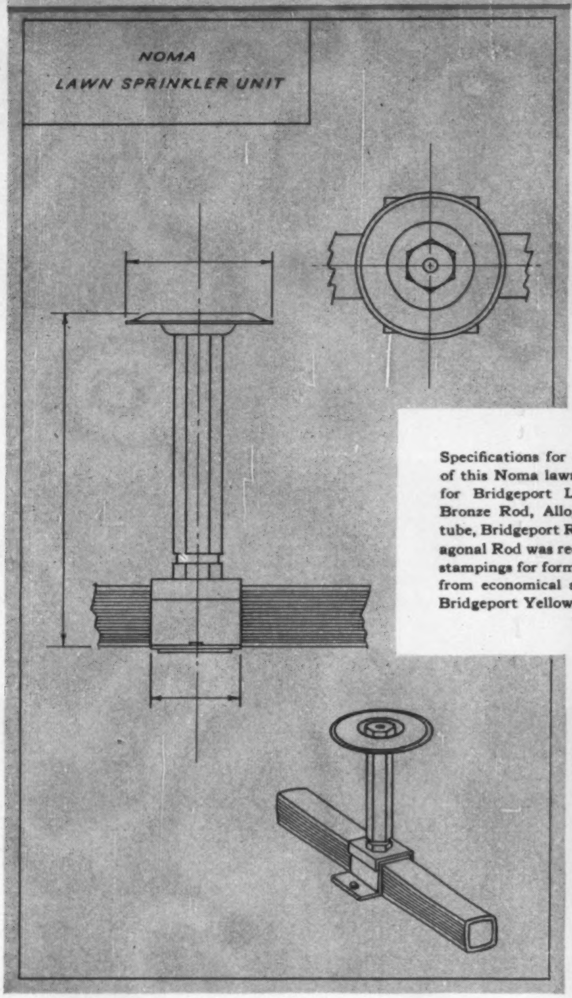
U. S. Tin Smelter Gets Reprieve

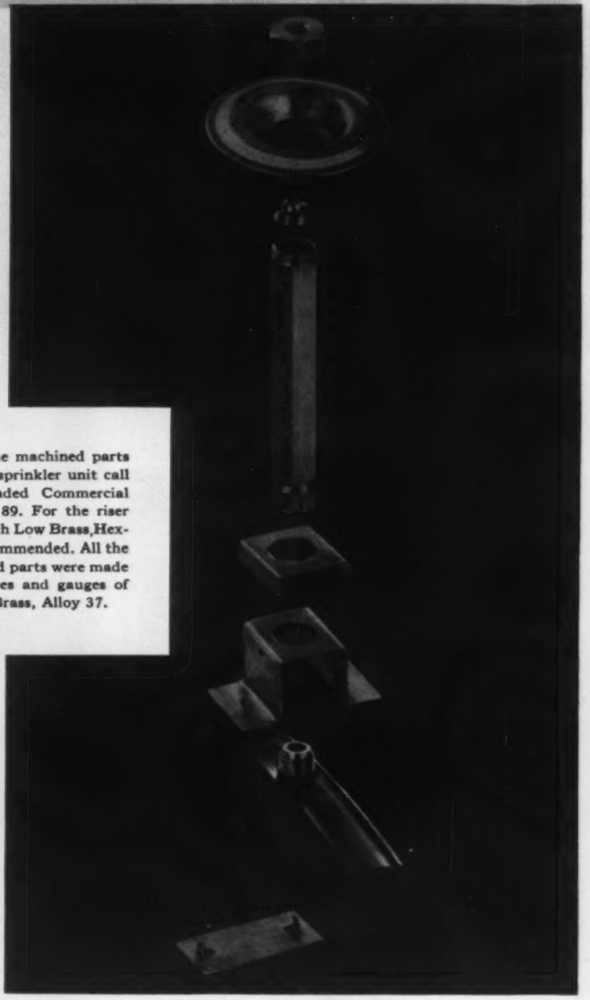
Tin prices are in a state of flux. Reason: The fate of the government's Texas City tin smelter is being decided. Office of Defense Mobilization Director Arthur S. Flemming has recommended that the smelter be kept open until Jan. 31, 1957. He agrees that the facility should be closed but feels that there will be some buyers by the end of the year. President Eisenhower has agreed that this may be the best solution. It is anticipated that Congress will go along with the ODM proposal. This will allow both political parties to sidestep any debate with Texas politicians until after elections are over.

Market Memos

- Shipments of magnesium wrought products totaled 951 tons in February. This compares with shipments of 824 tons during February, 1955. The January total was 1059 tons.
- Dr. Benjamin Lustman, Westinghouse Electric Corp., indicates that zirconium has many uses in nuclear reactors where its corrosion-resistant characteristics and low neutron absorption cross section can be utilized. Dr. Lustman says that one of the limitations is cost. "If we can cut the price in half, the market for zirconium will be doubled," he forecasts.
- Look for uranium to be used as an alloying element in magnesium.
- Kaiser Aluminum & Chemical Corp. is planning another expansion (see page 93).

Matching metal to job with Bridgeport alloys





Specifications for the machined parts of this Noma lawn sprinkler unit call for Bridgeport Leaded Commercial Bronze Rod, Alloy 89. For the riser tube, Bridgeport Rich Low Brass, Hexagonal Rod was recommended. All the stampings for formed parts were made from economical sizes and gauges of Bridgeport Yellow Brass, Alloy 37.

Photos courtesy Noma Spray Division, Noma Lites, Inc.

Whether it's machined or formed—there's a Bridgeport HIGH I. Q.* Alloy to match the job!

Producing a lawn sprinkler unit such as this requires a variety of metalworking operations. Bridgeport High I.Q.* alloys can meet all the requirements of your operations because they are job-matched to each production step. Whether your products involve one or many components, you can profit by using Bridgeport alloys. Your nearest Bridgeport sales office will be glad to help you select the alloys best suited for your particular job.

**High Inner Quality*

Bridgeport BRASS CO.

BRIDGEPORT BRASS

Offices in Principal Cities • Conveniently Located Warehouses

Bridgeport Brass Company, Bridgeport 2, Connecticut • In Canada: Noranda Copper and Brass Limited, Montreal

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 25.90; pigs, 24.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 27.70; No. 43, 5% Si, 27.50; No. 142, 4% Cu. 1.5% Mg. 2% Ni, 29.70; No. 195, 4.5% Cu, 0.8% Si, 29.10; No. 214, 3.8% Mg, 29.30; No. 356, 7% Si, 0.3% Mg, 27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb. f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%. $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 46.00 deld. Conn. Valley; 46.00 deld. Midwest: custom smelters, 50.50-51.00 deld.; Lake, 46.00 deld.; Fire refined, 45.75 deld.; Chilean electrolytic, 48.95 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%. $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99+, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis. 100 lb lots.

Magnesium: Pig, 32.50 f.o.b. Velasco, Tex.; ingot, 33.25 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 31.00 deld.; AZ63A, AZ92A, AZ91C (sand castings), 36.00 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $258-$260 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addtition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $97-$111 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 91.25 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 100.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45; grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.75-33.75; No. 12 foundry alloy (No. 2 grade), 30.00-31.00; 5% silicon alloy, 0.60 Cu max, 32.00-32.25; 13 alloy, 0.60 Cu max, 32.00-32.25; 195 alloy, 32.00-32.25; 108 alloy, 30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 30.50-31.00; grade 2, 29.00-30.00; grade 3, 29.00-29.50; grade 4, 28.00-28.50.

Brass Ingot: Red brass, No. 115, 44.00; tin bronze, No. 225, 58.00; No. 245, 50.75; high-leaded tin bronze, No. 305, 47.75; No. 1 yellow, No. 405, 34.75; manganese bronze, No. 421, 39.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 51.355-54.355; l.c.l., 51.98-54.98. Weatherproof, 30,000-lb lots, 48.28-50.53; l.c.l., 49.03-51.28. Magnetic wire deld., 15,000 lb or more, 58.68-61.84; l.c.l., 59.43-62.59.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANINUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00-24.00; ribbon zinc in coils, 21.50; plates, 20.00-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R. ..	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	—Round— 2011-T3	—Round— 2017-T4	—Hexagonal— 2011-T3	—Hexagonal— 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheet and Circle: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 99.00; .064 in., 78.00; .125 in., 63.50; .250-2.0 in., 61.00. AZ31A special grade, .032 in., 145.00; .064 in., 100.00; .125 in., 83.00; .250-2.0 in., 79.00. Tread plate, .125 in., 68.00; .250-3.0 in., 64.00. Tooling plate, .250-3.0 in., 65.00.

Extrusions	Com. Grade (FS)	Spec. Grade (AZ31B)
1 in. diam. rod	61.50	73.00
Shapes: 0.3 lb/ft	65.40-72.40	76.90-83.90
1.0 lb/ft	61.90-67.30	73.40-78.80
4.0 lb/ft	57.70-62.20	69.20-73.70
2 in. OD x ⅛ in. w. tubing	74.50	86.00

NONFERROUS SCRAP

DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 21.50; old sheets, 18.50; borings and turnings, 11.50-12.50; crankcases, 18.50; industrial castings, 18.00.

Copper and Brass: No. 1 heavy copper and wire, 41.50; No. 2 heavy copper and wire, 39.00; light copper, 36.00; No. 1 composition red brass, 31.00-31.50; No. 1 composition turnings, 30.00-30.50; yellow brass turnings,

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	67.13–70.13b	64.36–67.36c	....	67.32–70.32	45.000	45.000	44.250
Yellow Brass	55.60–57.60	45.65–47.51d	56.14–58.14	58.51–60.51	33.250	33.000	30.750
Low Brass, 80%....	60.15–62.55	60.09–62.49	60.69–63.09	62.96–65.36	33.750	37.500	37.000
Red Brass, 85%....	61.79-64.34	61.73–64.28	62.33–64.88	64.60–67.15	39.500	39.250	38.750
Com. Bronze, 90%..	63.98–66.68	63.92–66.62	64.52–67.22	66.54–69.24	41.250	41.000	40.500
Manganese Bronze ..	62.64–64.58	56.65–58.54	67.09–68.85	....	31.125	30.875	30.375
Muntz Metal	56.94–58.74	52.75–54.55	....	....	31.000	30.750	30.250
Naval Brass ....–..	58.90–60.70	53.21–55.01	65.96–67.76	62.06–63.86	30.750	30.500	30.000
Silicon Bronze	70.48–73.36	69.67–72.55	70.52–73.40	72.66–75.61e	43.625	43.375	42.625
Nickel Silver, 10%..	69.20–71.15	71.53–73.48g	71.53–73.48	....	36.625	36.375	18.313
Phos. Bronze, A, 5%	85.37–88.22	85.87–88.72	85.87–88.72	87.05–89.90	45.500	45.250	44.250

a. Cents per lb. f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20.000 lb. f.o.b. shipping point. On lots over 20.000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. Based on copper at 49 cents a pound. g. Leaded

19.50-20.50; new brass clippings, 28.00-28.50; light brass, 19.00-19.50; heavy yellow brass, 21.50-22.00; new brass rod ends, 26.50-27.00; auto radiators, unsweated, 24.00-24.50; cocks and faucets, 24.50-25.00; brass pipe, 25.00-25.50.

Lead: Heavy, 12.75-13.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.50; electrotype, 13.25-13.75; mixed babbitt, 15.50.
Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 60.00-70.00; old sheets, 55.00-70.00; turnings, 50.00; rods, 59.50-70.00.
Nickel: Sheets and clips, 100.00-150.00; rolled anodes, 100.00-150.00; turnings, 85.00-125.00; rod ends, 100.00-150.00.

Zinc: Old zinc, 6.00-6.50; new die-cast scrap, 6.00; old die-cast scrap, 3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Aluminum: 1100 clippings, 23.00-23.25; 3003 clippings, 23.00; 6151 clippings, 22.75; 5052 clippings, 22.75; 2014 clippings, 22.00-22.75; 2017 clippings, 22.00-22.75; 2024 clippings, 22.00-22.50; mixed clippings, 22.00-22.50; old sheet, 20.50-21.00; old cast, 20.50-21.00; clean old cable (free of steel), 22.75-23.00; borings and turnings, 20.50-21.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 68.00; light scrap, 63.00; turnings and borings, 48.00.
Copper and Brass: No. 1 heavy copper and wire, 43.50; No. 2 heavy copper and wire, 42.00; light copper, 39.75; refinery brass (60% copper) per dry copper content, 40.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 43.50; No. 2 heavy copper and wire, 42.00; light copper 39.75; No. 1 composition borings, 34.00; No. 1 composition solids, 34.50; heavy yellow brass solids, 25.00; yellow brass turnings, 24.00; radiators, 26.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 66.79; oval, 65.92, 5000-10,000 lb; electrodeposited, 64.25, 2000-5000 lb lots; cast 63.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

Tin: Bar or slab; less than 200 lb, $1.195; 200-499 lb, $1.180; 500-999 lb, $1.175; 1000 lb or more, $1.170.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis. New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb, and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 71.90; 100-600 lb, 63.40; 700-1900 lb, 60.90; 2000-9900 lb, 59.20; 10,000 lb or more, 58.00.

Stannous Chloride (anhydrous): Less than 25 lb, $1.690; 25 lb, $1.340; 100 lb, $1.190; 400 lb, $1.165; 5200-19,600 lb, $1.043; 20,000 lb or more, 92.10.

Stannous Sulphate: Less than 50 lb, $1.316; 50 lb, $1.016; 100-1900 lb, 99.60; 2000 lb or more, 97.60.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

Why sprinklers sprinkle when things get hot!

A major use of fusible alloys is in automatic sprinkler systems. Alloys made of various combinations of bismuth, cadmium, lead, zinc, tin and indium act as a lock to secure the spring-loaded valve which holds back water under pressure. At a predetermined temperature between 165 and 360 degrees Fahrenheit, the alloy melts, releasing the water through sprinklers to quench the incipient fire.

The Federated Metals Division of American Smelting and Refining Company is an important producer of fusible or low melting alloys with a wide variety of industrial applications. Federated's quality-controlled fusible alloys bear the name "AsarcoLo."

Like all other Federated non-ferrous metal products . . . ingots, solders, type metals, anodes . . AsarcoLo fusible alloys have been developed by Federated's modern research facilities and trained field sales engineers to meet modern industrial needs.

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DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
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Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead, Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.*
Code numbers following mill points indicate producing company. Key to producers, page 169; to footnotes, page 171.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$65.50

INGOTS, Alloy (NT)

Detroit R7	$69.00
Houston S5	74.00
Midland,Pa. C18	69.00
Munhall,Pa. U5	69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$68.50
Bessemer,Pa. U5	68.50
Bridgeport,Conn. N19	73.50
Buffalo R2	68.50
Clairton,Pa. U5	68.50
Ensley,Ala. T2	68.50
Fairfield,Ala. T2	68.50
Fontana,Calif. K1	78.00
Gary,Ind. U5	68.50
Johnstown,Pa. B2	68.50
Lackawanna,N.Y. B2	68.50
LoneStar,Tex. L6	74.50
Munhall,Pa. U5	68.50
Pittsburgh J5	68.50
S.Chicago,Ill. R2, U5	68.50
S.Duquesne,Pa. U5	68.50
Youngstown R2	68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5	$84.50
Bessemer,Pa. U5	84.50
Bridgeport,Conn. N19	89.50
Buffalo R2	84.50
Canton,O. R2	86.50
Clairton,Pa. U5	84.50
Conshohocken,Pa. A3	89.50
Ensley,Ala. T2	84.50
Fairfield,Ala. T2	84.50
Fontana,Calif. K1	94.00
Gary,Ind. U5	84.50
Geneva,Utah C11	84.50
Houston S5	101.00
Johnstown,Pa. B2	84.50
Lackawanna,N.Y. B2	84.50
LosAngeles B3	94.00
Midland,Pa. C18	84.50
Munhall,Pa. U5	84.50
Pittsburgh J5	84.50
Seattle B3	98.00
S.Chicago R2.U5,W14	84.50
S.Duquesne,Pa. U5	84.50
S.SanFrancisco B3	94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$96.00
Buffalo R2	96.00
Canton O. R2, T7	96.00
Conshohocken,Pa. A3	103.00
Detroit R7	96.00
Fontana,Calif. K1	117.00
Gary,Ind. U5	96.00
Houston S5	105.00
Ind.Harbor.Ind. Y1	96.00
Johnstown,Pa. B2	96.00
Lackawanna,N.Y. B2	96.00
LosAngeles B3	116.00
Massillon,O. R2	96.00
Midland,Pa. C18	96.00
Munhall,Pa. U5	96.00
S.Chicago R2.U5,W14	96.00
S.Duquesne,Pa. U5	96.00
Struthers,O. Y1	96.00
Warren,O. C17	96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$103.50
Canton,O. R2	103.50
Cleveland R2	103.50
Gary,Ind. U5	103.50
S.Chicago R2, W14	103.50
S.Duquesne,Pa. U5	103.50

SKELP

Aliquippa,Pa. J5	4.325
LoneStar,Tex. L6	4.625
Munhall,Pa. U5	4.225
SparrowsPoint,Md. B2	4.225
Warren,O. R2	4.225
Youngstown R2, U5	4.225

WIRE RODS

AlabamaCity,Ala. R2	5.375
Aliquippa,Pa. J5	5.375
Alton,Ill. L1	5.55
Buffalo W12	5.375
Cleveland A7	5.375
Donora,Pa. A7	5.375
Fairfield,Ala. T2	5.375
Houston S5	5.625
IndianaHarbor,Ind. Y1	5.375
Johnstown,Pa. B2	5.375
Joliet,Ill. A7	5.375
KansasCity,Mo. S5	5.625
Kokomo,Ind. C16	5.475
Los Angeles B3	6.175
Minnequa,Colo. C10	5.625
Monessen,Pa. P7	5.375
N.Tonawanda,N.Y. B11	5.375
Pittsburg,Calif. C11	6.025
Portsmouth,O. P12	5.375
Roebling,N.J. R5	5.475
S.Chicago,Ill. R2	5.375
SparrowsPoint,Md. B2	5.475
Sterling,Ill.(1) N15	5.375
Sterling,Ill. N15	5.475
Struthers,O. Y1	5.375
Worcester,Mass. A7	5.675

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	4.60
Aliquippa,Pa. J5	4.60
Bessemer,Ala. T2	4.60
Bethlehem,Pa. B2	4.65
Birmingham C15	5.10
Clairton,Pa. U5	4.60
Fairfield,Ala. T2	4.60
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.60
Geneva,Utah C11	4.60
Houston S5	4.70
Ind.Harbor,Ind. I-2	4.60
Johnstown,Pa. B2	4.65
KansasCity,Mo. S5	4.70
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.30
Minnequa,Colo. C10	4.90
Munhall,Pa. U5	4.60
Niles,Calif. P1	5.25
Phoenixville,Pa. P4	5.15
Portland,Oreg. O4	5.35
Seattle B3	5.35
S.Chicago U5, W14	4.60
S.SanFrancisco B3	5.25
Torrance,Calif. C11	5.30
Weirton,W.Va. W6	4.60

Wide Flange

Bethlehem,Pa. B2	4.65
Clairton,Pa. U5	4.60
Fontana,Calif. K1	5.45
Lackawanna,N.Y. B2	4.65
Munhall,Pa. U5	4.60
Phoenixville,Pa. P4	5.15
S.Chicago,Ill. U5	4.60

Alloy Std. Shapes

Clairton,Pa. U5	5.65
Fontana,Calif. K1	7.40
Gary,Ind. U5	5.65
Houston S5	5.75
Munhall,Pa. U5	5.65
S.Chicago,Ill. U5	5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	6.75
Bessemer,Ala. T2	6.75
Bethlehem,Pa. B2	6.80
Clairton,Pa. U5	6.75
Fairfield,Ala. T2	6.75
Fontana,Calif. K1	7.45
Gary,Ind. U5	6.75
Geneva,Utah C11	6.75
Houston S5	6.85
Ind.Harbor,Ind. I-2, Y1	6.75
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	6.85
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.45
Munhall,Pa. U5	6.75
Seattle B3	7.50
S.Chicago,Ill U5, W14	6.75
S.SanFrancisco B3	7.40
Struthers,O. Y1	6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	6.80
Lackawanna,N.Y. B2	6.80
Munhall,Pa. U5	6.75
S.Chicago,Ill. U5	6.75

PILING

BEARING PILES

Bethlehem,Pa. B2	4.65
Lackawanna,N.Y. B2	4.65
Munhall,Pa. U5	4.60
S.Chicago,Ill. U5	4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.45
Lackawanna,N.Y. B2	5.45
Munhall,Pa. U5	5.45
S.Chicago,Ill. U5	5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Ashland,Ky.(15) A10	4.50
Bessemer,Ala. T2	4.50
Bridgeport,Conn. N19	4.75
Buffalo R2	4.50
Clairton,Pa. U5	4.50
Claymont,Del. C22	4.80
Cleveland J5, R2	4.60
Coatesville,Pa. L7	4.80
Conshohocken,Pa. A3	4.50
Detroit M1	4.60
Ecorse,Mich. G5	4.60
Fairfield,Ala. T2	4.50
Fontana,Calif.(30) K1	5.20
Gary,Ind. U5	4.50
Geneva,Utah C11	4.50
GraniteCity,Ill. G4	4.70
Harrisburg,Pa. P4	5.10
Houston S5	4.60
Ind.Harbor,Ind. I-2, Y1	4.50
Johnstown,Pa. B2	4.50
Lackawanna,N.Y. B2	4.50
LoneStar,Tex. L6	4.85
Mansfield,O. E6	4.50
Minnequa,Colo. C10	5.35
Munhall,Pa. U5	4.50
Newport,Ky. N9	4.50
Pittsburgh J5	4.50
Riverdale,Ill. A1	4.725
Seattle B3	5.40
Sharon,Pa. S3	4.50
S.Chicago R2, U5, W14	4.50
SparrowsPoint,Md. B2	4.50
Steubenville,O. W10	4.50
Warren,O. R2	4.50
Weirton,W.Va. W6	4.50
Youngstown R2, U5, Y1	4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	5.65
Fontana,Calif. K1	6.35
Geneva,Utah C11	5.65
Johnstown,Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	10.40

PLATES, High Strength Low-Alloy

Aliquippa,Pa. J5	6.725
Bessemer,Ala T2	6.725
Clairton,Pa. U5	6.725
Cleveland J5, R2	6.725
Claymont,Del. C22	6.725
Coatesville,Pa. L7	7.025
Conshohocken,Pa. A3	6.725
Ecorse,Mich. G5	6.825
Fairfield,Ala. T2	6.725
Fontana,Calif.(30) K1	7.425
Gary,Ind. U5	6.725
Geneva,Utah C11	6.725
Houston S5	6.825
Ind.Harbor,Ind. I-2, Y1	6.725
Johnstown,Pa. B2	6.725
Munhall,Pa. U5	6.725
Pittsburgh J5	6.725
Seattle B3	7.625
Sharon,Pa. S3	6.725
S.Chicago,Ill. U5, W14	6.725
SparrowsPoint,Md. B2	6.725
Warren,O. R2	6.725
Youngstown U5, Y1	6.725

PLATES, Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.30
Coatesville,Pa. L7	6.30
Fontana,Calif. K1	7.00
Gary,Ind. U5	6.30
Houston S5	6.40
Ind.Harbor,Ind. Y1	6.30
Johnstown,Pa. B2	6.30
Munhall,Pa. U5	6.30
Newport,Ky. N9	6.30
Seattle B3	7.20
Sharon,Pa. S3	6.30
S.Chicago,Ill. U5, W14	6.30
SparrowsPoint,Md. B2	6.30
Youngstown Y1	6.30

FLOOR PLATES

Cleveland J5	5.575
Conshohocken,Pa. A3	5.575
Harrisburg,Pa. P4	5.575
Ind.Harbor,Ind. I-2	5.575
Munhall,Pa. U5	5.575
S.Chicago,Ill. U5	5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10	4.75
Ashland l.c.l. (15) A10	5.25
Cleveland c.l. R2	5.10
Warren,O. c.l. R2	5.10

BARS

(Commercial Quality)

BARS, Hot-Rolled Carbon

Ala.City,Ala.(9) R2	4.65
Aliquippa,Pa.(9) J5	4.65
Alton,Ill. L1	4.85
Atlanta A11	4.85
Bessemer,Ala.(9) T2	4.65
Birmingham C15	5.15
Bridgeport,Conn. N19	4.80
Buffalo(9) R2	4.65
Canton,O.(9) R2	4.75
Clairton,Pa.(9) U5	4.65
Cleveland(9) R2	4.65
Ecorse,Mich.(9) G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala.(9) T2	4.65
Fairless,Pa.(9) U5	4.80
Fontana,Calif. K1	5.35
Gary,Ind.(9) U5	4.65
Houston(9) S5	4.90
Ind.Harbor,Ind.(9) I-2	4.65
Ind.Harbor,Ind. Y1	4.65
Johnstown,Pa.(9) B2	4.65
Joliet,Ill. P22	5.15
KansasCity,Mo.(9) S5	4.90
Lackawanna(9) B2	4.65
LosAngeles(9) B3	5.35
Massillon,O.(9) R2	4.75
Midland,Pa.(9) C18	4.65
Milton,Pa. M18	4.80
Minnequa,Colo. C10	5.10
Niles,Calif. P1	5.35
N.T'wanda,N.Y.(9) B11	4.65
Pittsburg,Calif.(9) C11	5.35
Pittsburgh(9) J5	4.65
Portland,Oreg. O4	5.40
Seattle B3, N14	5.40
S.Chicago W14	4.65
S.Chicago,Ill.(9) R2, U5	4.65
S.Duquesne,Pa.(9) U5	4.65
S.SanFran.,Calif.(9) B3	5.40
Sterling,Ill.(1) N15	4.65
Sterling,Ill. N15	4.75
Struthers,O. Y1	4.65
Torrance,Calif(9) C11	5.35
Warren,O.(9) R2	4.65
Weirton,W.Va.(9) W6	4.65
Youngston(9) R2, U5	4.65

BARS, H.R. Leaded Alloy

Warren,O. C17	6.575

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	5.575
Bridgeport,Conn. N19	5.725
Buffalo R2	5.575
Canton,O. R2, T7	5.575
Clairton,Pa. U5	5.575
Detroit R7	5.575
Ecorse,Mich. G5	5.675
Fairless,Pa. U5	5.725
Fontana,Calif. K1	6.625
Gary,Ind. U5	5.575
Houston S5	5.825
Ind.Harbor,Ind. I-2, Y1	5.575
Johnstown,Pa. B2	5.575
KansasCity,Mo. S5	5.825
Lackawanna,N.Y. B2	5.575
LosAngeles B3	6.625
Massillon,O. R2	5.575
Midland,Pa. C18	5.575
S.Chicago R2, U5, W14	5.575
S.Duquesne,Pa. U5	5.575
Struthers,O. Y1	5.575
Warren,O. C17	5.575
Youngstown U5	5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	6.80
Bessemer,Ala. T2	6.80
Bethlehem,Pa. B2	6.80
Clairton,Pa. U5	6.80
Cleveland R2	6.80
Ecorse,Mich. G5	6.90
Fairfield,Ala. T2	6.80
Fontana,Calif. K1	7.50
Gary,Ind. U5	6.80
Houston S5	7.05
Ind.Harb.,Ind. I-2, Y1	6.80
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	7.05
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.50
Pittsburgh J5	6.80
Seattle B3	7.55
S.Chicago W14	6.80
S.Duquesne,Pa. U5	6.80
S.SanFrancisco B3	7.55
Struthers,O. Y1	6.80
Warren,O. R2	6.80
Youngstown U5	6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2	4.80
Lackawanna(9) B2	4.65

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	4.65
Atlanta A11	4.85
Fontana,Calif. K1	5.35
Joliet,Ill. P22	5.10
Niles,Calif. P1	5.35
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
SanFrancisco S7	5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	5.65
Gary,Ind. U5	5.65
Houston S5	5.90
KansasCity,Mo. S5	5.90
Youngstown U5	5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18	8.325
Camden,N.J. P13	8.35
Chicago W18	8.325
Cleveland C20	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
SpringCity,Pa. K3	8.30
Warren,O. C17	8.575

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	6.25
BeaverFalls,Pa. M12,R2	6.25
Buffalo B5	6.30
Camden,N.J. P13	6.70
Carnegie,Pa. C12	6.25
Chicago W18	6.25
Cleveland A7, C20	6.25
Detroit B5, P17	6.45
Detroit R7	6.25
Donora,Pa. A7	6.25
Elyria,O. W8	6.25
FranklinPark,Ill. N5	6.25
Gary,Ind. R2	6.25
GreenBay,Wis. F7	6.25
Hammond,Ind. L2, M13	6.25
Hartford,Conn. R2	6.75
Harvey,Ill. B5	6.25
LosAngeles(49) S30	7.70
LosAngeles R2	7.70
Mansfield,Mass. B5	6.80
Massillon,O. R2, R8	6.25
Midland,Pa. C18	6.25
Monaca,Pa. S17	6.25
Newark,N.J. W18	6.70
NewCastle,Pa.(17) B4	6.25
Pittsburgh J5	6.25
Plymouth,Mich. P5	6.50
Putnam,Conn. W18	6.80
Readville,Mass. C14	6.80
S.Chicago,Ill. W14	6.25
SpringCity,Pa. W3	6.70
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. W19	6.70
Youngstown F3, Y1	6.25

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19	5.16

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	7.425
BeaverFalls,Pa.M12,R2	7.425
Bethlehem,Pa. B2	7.425
Buffalo B5	7.425
Camden,N.J. P13	7.60
Canton,O. T7	7.425
Carnegie,Pa. C12	7.425
Chicago W18	7.425
Cleveland A7, C20	7.425
Detroit R7	7.425
Detroit B5, P17	7.625
Donora,Pa. A7	7.425
Elyria,O. W8	7.425
Gary,Ind. R2	7.425
GreenBay,Wis. F7	7.425
Hammond,Ind. L2, M13	7.425
Hartford,Conn. R2	7.725
Harvey,Ill. B5	7.425
Lackawanna,N.Y. B2	7.425
LosAngeles S30	9.10
Mansfield,Mass. B5	7.725
Massillon,O. R2, R8	7.425
Midland,Pa. C18	7.425
Monaca,Pa. S17	7.425
Newark,N.J. W18	7.60
Plymouth,Mich. P5	7.625
S.Chicago W14	7.425
SpringCity,Pa. K3	7.60
Struthers,O. Y1	7.425
Warren,O. C17	7.425
Waukegan,Ill. A7	7.425
Worcester,Mass. A7	7.725
Youngstown F3, Y1	7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	4.65
Atlanta A11	4.85
Birmingham C15	5.15
Buffalo R2	4.65
Cleveland R2	4.65
Ecorse,Mich. G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala. T2	4.65
Fairless,Pa. U5	4.80
Fontana,Calif. K1	5.35
Ft.Worth,Tex.(42) T4	5.10
Gary,Ind. U5	4.65
Houston S5	4.90

Ind.Harbor,Ind. I-2, Y1	4.65
Johnstown,Pa. B2	4.65
Joliet,Ill. P22	5.15
KansasCity,Mo. S5	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.35
Milton,Pa. M18	4.80
Minnequa,Colo. C10	5.10
Niles,Calif. P1	5.35
Pittsburg,Calif. C11	5.35
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
SandSprings,Okla. S5	5.15
Seattle B3, N14	5.40
S.Chicago R2	4.65
S.Duquesne,Pa. U5	4.65
S.SanFrancisco B3	5.40
SparrowsPoint,Md. B2	4.65
Sterling,Ill.(1) N15	4.65
Sterling,Ill. N15	4.75
Struthers,O. Y1	4.65
Torrance,Calif. C11	5.35
Youngstown R2, U5	4.65

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2	6.15
KansasCity,Kans. S5	6.45
Lackawanna,N.Y. B2	6.17
Marion,O. P11	6.15
Pittsburgh U8	6.17
Seattle B3, N14	6.60
SparrowsPt. ¼-1" B2	6.15
Williamsport,Pa. S19	6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2	4.65
ChicagoHts.(4) C2, I-2	4.65
Ft.Worth,Tex.(26) T4	5.10
Franklin,Pa(3) F5	4.65
Franklin,Pa.(4) F5	4.65
JerseyShore,Pa.(4) J8	4.65
Marion,O.(3) P11	4.65
Moline,Ill.(3) R2	4.80
Tonawanda(3) B12	4.65
Tonawanda(4) B12	5.15
Williamsport,Pa.(3) S19	4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14	11.50
Economy,Pa.(D.R.)B14	14.30
Economy(Staybolt)B14	14.65
McK.Rks. (S.R.) L5	11.50
McK.Rks.(D.R.) L5	16.00
McK.Rks.(Staybolt) L5	17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2	4.325
Allenport,Pa. P7	4.325
Ashland,Ky.(8) A10	4.325
Cleveland J5, R2	4.325
Conshohocken,Pa. A3	4.375
Detroit(8) M1	4.425
Dravosburg,Pa. U5	4.325
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fairless,Pa. U5	4.375
Fontana,Calif. K1	5.125
Gary,Ind. U5	4.325
Geneva,Utah C11	4.425
GraniteCity,Ill. G4	4.525
Ind.Harbor,Ind. I-2,Y1	4.325
Lackawanna,N.Y. B2	4.325
Mansfield,O. E6 (37)	4.325
Munhall,Pa. U5	4.325
Newport,Ky.(8) N9	4.325
Niles,O. M21	4.325
Pittsburg,Calif. C11	5.025
Pittsburgh J5	4.325
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.55
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
SparrowsPoint,Md. B2	4.325
Steubenville,O. W10	4.325
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5, Y1	4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2	5.625
Niles,O. M21	5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1	7.20
Youngstown Y1	7.20

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2	6.375
Conshohocken,Pa. A3	6.425
Dravosburg,Pa. U5	6.375
Ecorse,Mich. G5	6.475
Fairfield,Ala. T2	6.375
Fairless,Pa. U5	6.425
Fontana,Calif. K1	7.175
Gary,Ind. U5	6.375
Ind.Harbor,Ind. I-2, Y1	6.375
Lackawanna(35) B2	6.375
Munhall,Pa. U5	6.375
Pittsburgh J5	6.375
Sharon,Pa. S3	6.375
S.Chicago,Ill. U5	6.375
SparrowsPoint(36) B2	6.375
Warren,O. R2	6.375
Youngstown U5, Y1	6.375

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10	4.575
Ind.Harbor,Ind. I-2	4.575

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7	5.325
Cleveland J5, R2	5.325
Conshohocken,Pa. A3	5.375
Dravosburg,Pa. U5	5.325
Detroit M1	5.325
Ecorse,Mich. G5	5.425
Fairfield,Ala. T2	5.325
Fairless,Pa. U5	5.375
Follansbee,W.Va. F4	5.325
Fontana,Calif. K1	6.525
Gary,Ind. U5	5.325
GraniteCity,Ill. G4	5.525
Ind.Harbor,Ind. I-2, Y1	5.325
Lackawanna, N.Y. B2	5.325
Mansfield,O. E6	5.325
Middletown,O. A10	5.325
Newport,Ky. N9	5.325
Pittsburg,Calif. C11	6.275
Pittsburgh J5	5.325
Portsmouth,O. P12	5.325
SparrowsPoint,Md. B2	5.325
Steubenville,O. W10	5.325
Warren,O. R2	5.325
Weirton,W.Va. W6	5.325
Youngstown Y1	5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2	7.875
Dravosburg,Pa. U5	7.875
Ecorse,Mich. G5	7.975
Fairless,Pa. U5	7.925
Fontana,Calif. K1	9.075
Gary,Ind. U5	7.875
IndianaHarbor,Ind. Y1	7.875
Lackawanna(37) B2	7.875
Pittsburgh J5	7.875
SparrowsPoint(38) B2	7.875
Warren,O. R2	7.875
Weirton,W.Va. W6	7.875
Youngstown Y1	7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10	5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10	7.15
Gary,Ind. U5	6.35
MartinsFry,O. W10	6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2	5.85‡
Ashland,Ky. A10	5.85†
Canton,O. R2	5.85‡
Dover,O. R1	5.85†
Dravosburg,Pa. U5	5.85†
Fairfield,Ala. T2	5.85†
Gary,Ind. U5	5.85*
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. I-2	5.85†
Kokomo,Ind. C16	5.95‡
MartinsFerry,O. W10	5.85*
Middletown,O. A10	5.85†
Newport,Ky. N9	5.85‡
Pittsburg,Calif. C11	6.60*
Pittsburgh J5	5.85†
SparrowsPt.,Md. B2	5.85†
Warren,O. R2	5.85†
Weirton,W. Va. W6	5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1	6.625

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5	8.60
SparrowsPoint(39) B2	8.60

SHEETS, Galvannealed Steel

Canton,O. R2	6.25
Dravosburg,Pa. U5	6.25
Kokomo,Ind. C16	6.60
Newport,Ky. N9	6.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10	6.10
Middletown,O. A10	6.10

SHEETS, Electrogalvanized

Cleveland(28) R2	6.70
Niles, O.(28) R2	6.70
Weirton,W.Va. W6	6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)	8.50
Butler,Pa. A10 (type 2)	8.69

SHEETS, Enameling Iron

Ashland,Ky. A10	5.90
Cleveland R2	5.90
Dravosburg,Pa. U5	5.90
Gary,Ind. U5	5.90
GraniteCity,Ill. G4	6.10
Ind.Harbor,Ind. I-2	5.90
Middletown,O. A10	5.90
Niles,O. M21	5.90
Youngstown Y1	5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4	7.75
Ind.Habor,Ind. I-2	7.75
Yorkville,O. W10	7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	6.25
Gary,Ind. U5	6.25
Mansfield,O. E6	6.25
Middletown,O. A10	6.25
Niles,O. M21	6.25
Weirton,W.Va. W6	6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	6.65

Key To Producers

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A5	Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6	American Shim Steel Co.
A7	American Steel & Wire Div., U. S. Steel Corp.
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
B1	Babcock & Wilcox Co.
B2	Bethlehem Steel Co.
B3	Beth. Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B8	Braeburn Alloy Steel
B9	Brainard Steel Div., Sharon Steel Corp.
B10	E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11	Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12	Buffalo Steel Corp.
B14	A. M. Byers Co.
B15	J. Bishop & Co.
C1	Calstrip Steel Corp.
C2	Calumet Steel Div. Borg-Warner Corp.
C4	Carpenter Steel Co.
C7	Cleve.Cold Rolling Mills
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia-Geneva Steel
C12	Columbia Steel & Shaft.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft.
C15	Connors Steel Div. H. K. Porter Co. Inc.
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
C22	Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23	Charter Wire Inc.
C24	G. O. Carlson Inc.
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel Div., Sharon Steel Corp.
D4	Disston & Sons, Henry
D6	Driver-Harris Co.
D7	Dickson Weatherproof Nail Co.
D8	Damascus Tube Co.
D9	Wilbur B. Driver Co.
E1	Eastern Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliott Bros. Steel Co.
E6	Empire Steel Corp.
F2	Firth Sterling Inc.
F3	Fitzsimmons Steel Co.
F4	Follansbee Steel Corp.
F5	Franklin Steel Div. Borg-Warner Corp.
F6	Fretz-Moon Tube Co.
F7	Ft.HowardSteel&Wire
F8	Ft. Wayne Metals Inc.
G2	Globe Iron Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
H7	Helical Tube Co.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div., Borg-Warner Corp.
I-6	Ivins, E., Steel Tube
I-7	Indiana Steel&Wire Co.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel&Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
K7	Kenmore Metals Corp.
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Steel Co.
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.
M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M6	Mercer Pipe Div., Sawhill Tubular Products
M8	Mid-States Steel & Wire
M12	Moltrup Steel Products
M13	Monarch Steel Div., Jones & Laughlin Steel Corp.
M14	McInnes Steel Co.
M16	Md.Fine&Special Wire
M17	Metal Forming Corp.
M18	Milton Steel Prod. Div., Merritt-Chapman&Scott
M21	Mallory-Sharon Titanium Corp.
N1	National-Standard Co.
N2	National Supply Co.
N3	National Tube Div., U.S. Steel Corp.
N5	Nelsen Steel & Wire Co.
N6	New Eng. High Carb. Wire
N8	Newman-Crosby Steel
N9	Newport Steel Corp.
N14	Northwest.SteelRoll.Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
N19	Northeastern Steel Corp.
O3	Oliver Iron & Steel Corp.
O4	Oregon Steel Mills
P1	PacificStatesSteelCorp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke&Chem.
P7	Pittsburgh Steel Co.
P11	Pollak Steel Co.
P12	Portsmouth Division, Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
P19	Pitts. Rolling Mills
P20	Prod. Steel Strip Corp.
P22	Phoenix Mfg. Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	RelianceDiv.,EatonMfg.
R9	Rome Mfg. Co.
R10	Rodney Metals Inc.
S1	Senaca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S4	Sharon Tube Co.
S5	Sheffield Steel Div., Armco Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S12	Spencer Wire Corp.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
S20	Southern States Steel
S23	Superior Tube Co.
S25	Stainless Welded Prod.
S26	Specialty Wire Co. Inc.
S30	Sierra Drawn Steel Corp.
S40	Seneca Steel Service
T2	Tenn. Coal & Iron Div., U. S. Steel Corp.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Strip Division, Pittsburgh Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
T13	Tube Methods Inc.
U4	Universal-Cyclops Steel
U5	United States Steel Corp.
U6	U. S. Pipe & Foundry
U7	Ulbrich Stainless steels
U8	U. S. Steel Supply Div. U. S. Steel Corp.
V2	Vanadium-Alloys Steel
V3	Vulcan Crucible Division, H. K. Porter, Inc.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel&Mfg. Co.
W8	Western Automatic Machine Screw Co.
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
W19	Worcester Pressed Steel
Y1	Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.825
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.125
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2,Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
Pittsburg,Calif. C11	5.075
Riverdale,Ill. A1	4.55
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.95
Gary Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.575
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2,Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.30
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7, D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30
Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	9.10
SparrowsPoint,Md. B2	9.10
Warren,O. R2	9.10
Weirton,W.Va. W6	9.10
Youngstown Y1	9.30

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.35*
Warren,O. T5	6.25*
Warren,O. B9	6.45*
Worcester,Mass. A7	6.80*
Youngstown C8	6.25*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

STRIP, Cold-Finished Spring Steel (Annealed)

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.90	13.05	15.75
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D3	7.20	9.15	10.70	....	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	....	....
New York W3	...	9.35	10.90	13.05	15.75
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.80	18.15	....
Buffalo W12	...	...	14.80	....	....
FranklinPark,Ill. T6	...	...	15.15	18.50	22.35
Harrison,N.J. C18	...	...	14.80	18.15	22.00
NewYork W3	...	...	14.80	18.15	22.00
Trenton,N.J. R5	...	...	14.80	18.15	22.00
Worcester,Mass. W12	...	...	14.80	....	....
Worcester,Mass. A7, T6	...	...	14.80	18.15	22.00
Youngstown C8	...	...	15.15	18.50	22.35

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	....	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80§	13.35§	13.85§	14.85§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	18.45	13.55**
Butler,Pa. A10	....	....	17.45	17.95	....	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	....	13.55
Warren,O. R2	....	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
Fairless,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55
ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.675	....	....
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa. U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1	9.20	9.45
Pitts.,Calif. C11	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10	9.20	9.45

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
Fairless,Pa. U5	7.10
Gary,Ind. U5	7.00
GraniteCity,Ill. G4	7.10
Ind.Harbor,Ind. I-2, Y1	7.00
Niles,O. R2	7.00
Pittsburg,Calif. C11	7.75
SparrowsPoint,Md. B2	7.10
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00
Yorkville,O. W10	7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$8.70
Gary,Ind. U5	8.70
Yorkville,O. W10	8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.60
Aliquippa,Pa. J5	6.60
Alton,Ill. L1	6.775
Atlanta A11	6.80
Bartonville,Ill. K4	*6.70*
Buffalo W12	6.60
Chicago W13	6.60
Cleveland A7	6.60
Crawfordsville,Ind. M8	6.70
Donora,Pa. A7	6.60
Duluth,Minn. A7	6.60
Fairfield,Ala. T2	6.60
Fostoria,O.(24) S1	6.80
Houston S5	6.85
Jacksonville,Fla. M8	6.95
Johnstown,Pa. B2	6.60
Joliet,Ill. A7	6.60
KansasCity,Mo. S5	6.85
Kokomo,Ind. C16	6.70
LosAngeles B3	7.55
Minnequa,Colo. C10	6.85
Monessen,Pa. P7	6.60
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.60
Palmer,Mass. W12	6.90
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.60
Rankin,Pa. A7	6.60
S.Chicago,Ill. R2	6.60
S.SanFrancisco C10	7.55
SparrowsPoint,Md. B2	6.70
Sterling,Ill.(1) N15	6.60
Sterling,Ill. N15	6.70
Struthers,O. Y1	6.60
Waukegan,Ill. A7	6.60
Worcester,Mass. A7	6.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8"Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80
Struthers,O. Y1	10.70

ROPE WIRE	(A)
Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	10.55
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.50
Baltimore T6	9.80
Boston T6	9.80
Buffalo W12	9.50
Cleveland A7	9.50
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.50
Fostoria,O. S1	9.50
FranklinPark,Ill. T6	9.60
Kokomo,Ind. C16	9.50
Massillon,O. R8	9.50
Milwaukee C23	9.70
Monessen,Pa. P16	9.00
Pawtucket.R.I. N8	9.80
Riverdale,Ill. A1	9.60
Rome,N.Y. R6	*9.50*
Trenton,N.J. R5	9.80
Worcester A7, T6, W12	9.80

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlaabmaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Jack'ville,Fla.(23) M8	162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill.(44) R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville.Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Jack'ville,Fla.(23) M8	162
Johnstown.Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago.Ill.(44) R2	152
SparrowsPt., Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.45
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville.Ind. M8	9.45
Donora,Pa. A7	9.45
Duluth,Minn. A7	9.45
Jacksonville.Fla. M8	9.88
Johnstown,Pa. B2	9.45
Joliet,Ill. A7	9.45
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	10.23
S.Chicago,Ill. R2	9.45
SparrowsPt.,Md. B2	9.55
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.75
Bartonville,Ill. K4	9.75
Buffalo W12	9.65
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.75
Duluth,Minn. A7	9.75
Jacksonville,Fla. M8	10.18
Johnstown,Pa. B3	9.75
Joliet,Ill. A7	9.75
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
Pittsburg,Calif. C11	10.55
S.Chicago,Ill. R2	9.75
SparrowsPt.,Md. B2	9.85
Sterling,Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.80
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.80
Duluth,Minn. A7	9.80
Jacksonville.Fla. M8	10.23
Johnstown,Pa. B2	9.80
Joliet,Ill. A7	9.80
Kokomo,Ind. C16	9.80
LosAngeles B3	10.50
Minnequa.Colo. C10	9.95
Pitsburg,Calif. C11	10.60
S.Chicago.Ill. R2	9.80
SparrowsPt.,Md. B2	9.90
Sterling,Ill. N15	9.70

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	175**
Aliquippa,Pa. J5	172§
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180**
Jacksonville,Fla. M8	186
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180**
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	178††
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179††

WOVEN FENCE, 9-15 ga.	Col.
Ala.City,Ala. R2	192**
Ala.City, 17 ga. R2	257**
Aliq'ppa,Pa.9-14½ga J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167**
Jacksonville,Fla. M8	173
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167**
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166††
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166††

WIRE (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.50	16.55
Buffalo W12	14.50	....
Cleveland A7	14.50	....
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16 15†
Jacksonville M8	14.85	16.80
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer.MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05
Worcester A7	14.80	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.50	7.90**
Aliquippa J5	7.40	7.925§
Atlanta A11	7.60	8.20
Bartonville(48) K4	*7.60*	*8.20*
Buffalo W12	7.40	8.80†
Cleveland A7	7.50	....
Crawfordsville M8	7.50	8.10
Donora,Pa. A7	7.50	7.90†
Duluth,Minn. A7	7.50	7.90†
Fairfield T2	7.50	7.90†
Houston(48) S5	7.65	8.05**
Jacks'ville,Fla.M8	7.75	8.35
Johnstown B2(48)	7.50	8.10*
Joliet,Ill. A7	7.50	7.90†
Kans.City(48) S5	7.65	8.05**
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925*
Minnequa C10	7.65	8.05**
Monessen P7(48)	7.40	8.00††
Palmer.Mass. W12	7.70	8.10†
Pitts.,Calif. C11	8.45	8.85†
Portsmouth,O. P12	7.40	....
Rankin A7	7.50	7.90†
S.Chicago R2	7.50	7.90**
S.SanFran. C10	8.35	8.75**
Spar'wsPt. B2(48)	7.60	8.20*
Str'lng(1)(48)N15	7.40	8.00††
Struthers,O.(48)Y1	7.40	7.90‡
Worcester,Mass.A7	7.80	8.20†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	175
Atlanta A11	175
Bartonville,Ill. K4	*177*
Crawfordsville.Ind. M8	175
Donora,Pa. A7	175
Duluth,Minn. A7	175
Fairfield.Ala. T2	175
Jacksonville,Fla. M8	180
Joliet,Ill. A7	175
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Pitts.,Calif. C11	199
S.Chicago R2	175
S.SanFran.,Calif. C10	197
SparrowsPoint,Md. B2	*177*
Sterling,Ill.(1) N15	173

FENCE POSTS	Col.
ChicagoHts.,Ill. C2, I-2	157
Duluth,Minn. A7	157
Franklin,Pa. F5	157
Huntington,W.Va. W7	157
Johnstown,Pa. B2	157
Marion,O. P11	157
Minnequa,Colo. C10	162
Moline,Ill. R2	162
S.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	157
Williamsport,Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts	
Full-Size Body (cut thread)	
†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted):	
½" x 6" and smaller.	61

†½" x 4" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized:	
½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32
Lag Bolts	
All diams. & 6" and shorter	61
All diams. longer than 6"	55
Plow, Tap & Blank Bolts	
½" x 6" and smaller.	61
Larger than ½" diam. and all diams. longer than 6"	55
Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:	
All sizes	61
STOVE BOLTS, SLOTTED (nuts not attached; bulk)	
⅛" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
$\frac{5}{16}$" to ½" diam. incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces	61
100,000 or more pieces	64

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95

$\frac{7}{16}$-in. under. .List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2¼	12	37.73	44.63	36.60
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	...
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	...
Johnstown,Pa. B2	....	....	...	(16)5.65
Lackawanna,N.Y. B2	4.725	4.625	...	(16)5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	...
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES	
Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS, Untreated	
Cleveland R2	12.15
KansasCity,Mo. S5	12.90*
Lebanon,Pa. B2	12.15
Minnequa,Colo. C10	12.15
Pittsburgh O3, P14	12.15
Seattle B3	12.65

*Treated

AXLES	
Ind.Harbor.Ind. S13	7.50
Johnstown,Pa. B2	7.50

JOINT BARS	
Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES	
Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES	
Fairfield,Ala. T2	*8.05*
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	8.05
Minnequa,Colo. C10	7.90
Pittsburgh J5	*8.05*
Seattle B3	8.40
S.Chicago,Ill. R2	8.05
Struthers,O. Y1	7.90
Youngstown R2	8.05

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
98+% Fe, annealed.	9.25
Swedish, c.i.f., Camden, N. J., c.l. in bags	9.50
Domestic, f.o.b., Johnstown, Pa., Riverton, N.J., Niagara Falls, N.Y., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb. containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.75-55.00†
Bronze, 5000-lb lots	66.50-70.75†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	61.75-64.25†
Phosphor-Copper, 5000-lb lots	68.75
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.25-33.00‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb.	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

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(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Plus 4c per 100 lb.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N2	6.5	...	10.5	....	13	....	14.5	....	14.5	....	14	....	16.5	....
Lorain, O. N3	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+18.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless, Pa. N3	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	....	....	....	....	....	....	6	+13.25	9	+9.25	11.5	+5.75	14	+4
Ind. Harbor, Ind. Y1	....	....	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Youngstown R2, Y1	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	....	....	....
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

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*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging —Billets—	Seamless Tube	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	43.25	45.25	48.00	52.25	52.25
305	23.25	30.25	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	23.50	30.50	38.50	44.25	41.25	43.25	45.50	49.75	52.00	52.00
309	31.00	39.75	46.75	53.50	53.50	52.00	54.75	58.25	67.00	67.00
310	37.25	48.00	62.25	72.25	68.50	69.75	73.50	75.25	78.75	78.75
314	....	....	....	....	....	69.75	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	57.75	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.50	63.25	62.75	65.75	69.00	73.25	73.25
317	37.25	48.25	62.75	72.75	75.50	70.75	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	43.00	45.25	49.25	54.25	54.25
18-8CcTa	29.25	38.00	45.75	52.25	53.25	50.75	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	....	....
420	....	30.25	31.00	36.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	34.50	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp., Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Tool Steel

	—Plates— Carbon Base 10%	20%	Sheets Carbon Base 20%
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	—Strip, Carbon Base— —Cold Rolled— 10%	Both Sides
Copper*	32.75	41.25

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*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Clad Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	54.50	....	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	*60.00*	*60.50*	*61.00*	*61.50*
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	60.50	61.00	61.50
Boston, deld.	*70.65*	*71.15*	*71.65*	....
Rochester,N.Y. deld.	*63.02*	*63.52*	*64.02*	....
Syracuse,N.Y. deld.	*64.12*	*64.62*	*65.12*	....
Chicago District				
Chicago I-3	60.00	60.50	60.50	61.00
Gary,Ind. U5	*60.00*	....	*60.50*	....
S.Chicago R2	*60.00*	....	*60.50*	....
S.Chicago,Ill. Y1	60.00	60.50	60.50	61.00
S.Chicago,Ill. U5, W14	60.00	....	60.50	61.00
Milwaukee, deld.	62.30	62.80	62.80	63.30
Muskegon,Mich. deld.	....	67.18	67.18	....
Cleveland District				
Cleveland R2, A7	*60.00*	*60.50*	*60.50*	*61.00*
Akron,O. deld.	*62.75*	*63.25*	*63.25*	*63.75*
Lorain, O. N3	*60.00*	....	....	*61.00*
Mid-Atlantic District				
Bethlehem,Pa. B2	62.00	62.50	63.00	63.50
NewYork, deld.	....	66.51	67.01	....
Newark, deld.	65.20	65.70	66.20	66.70
Birdsboro,Pa. B10	62.00	62.50	63.00	63.50
Chester,Pa. P14	62.00	62.50	63.00	....
Philadelphia, deld.	63.76	64.26	64.70	....
Steelton,Pa. B2	62.00	62.50	63.00	63.50
Swedeland,Pa. A3	62.00	62.50	63.00	63.50
Philadelphia, deld.	63.76	64.26	64.76	65.26
Troy,N.Y. R2	*62.00*	*62.50*	*63.00*	*63.50*
Pittsburgh District				
NevilleIsland,Pa. P6	60.00	60.50	60.50	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	61.95	61.95	62.48
McKeesRock, deld.	....	61.60	61.60	62.13
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	62.26	62.26	62.79
Verona,Trafford, deld.	62.29	62.82	62.82	63.35
Brackenridge, deld.	62.60	63.10	63.10	63.63
Bessemer,Pa. U5	*60.00*	....	*60.50*	*61.00*
Clairton,Rankin,S.Duquesne,Pa. U5	*60.00*	....	....	
McKeesport,Pa. N3	*60.00*	....	....	*61.00*
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	*60.50*	....
Sharpsville,Pa. S6	60.00	....	60.50	61.00
Youngstown Y1	....	....	*60.50*	*61.00*
Youngstown U5	*60.00*	....	....	*61.00*
Mansfield,O. deld.	*64.90*	....	*65.40*	*65.90*
Duluth I-3	60.00	60.50	60.50	61.00
Erie,Pa. I-3	60.00	60.50	60.50	61.00
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	66.00	66.50	....	....
Geneva,Utah C11	*60.00*	*60.50*	....	....
GraniteCity Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	*60.00*	*60.50*	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	62.00	62.50	63.00	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	60.00	60.50	60.50	61.00
Cincinnati, deld.	65.76	66.26	....	....

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*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.

‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	*69.00*
Buffalo H1	*70.25*

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	*$92.50*
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	*97.00*
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	*100.00*

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton Pa. B2 (Phos. 0.035% max)	68.00
Philadelphia, deld.	*71.55*
Troy,N.Y. R2 (Phos. 0.035% max)	*68.00*
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	*65.00*
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	*65.00*
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	*65.00*
Pittsburgh P6 (Intermediate) (Phos. 0.036-0.075% max)	65.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	7.42	...	9.39	....	7.63	7.49	9.48
Baltimore	7.24	8.35	8.50	....	7.70	7.70	...	8.49[8]	14.39	7.94	7.56	9.02
Birmingham	7.13	8.24	8.85	....	7.21	7.27	7.80	9.35	....	7.43	7.45	9.50
Boston	8.12	9.07	10.32	53.32	8.21	8.21	8.76	9.73	13.56	8.27	8.41	9.84
Buffalo	7.20	8.25	10.01	....	7.35	7.35	8.05	7.90	13.35	7.60	7.65	9.00
Chattanooga	7.28	8.44	8.60	....	7.36	7.42	7.95	9.18	....	7.63	7.60	9.32
Chicago	7.13	8.24	9.10	46.75	7.21	7.27	7.80	7.75	13.05	7.43	7.45	8.72
Cincinnati	7.25	8.23	9.10	46.10	7.45	7.51	8.04	8.15	13.29	7.90	7.74	8.97
Cleveland	7.13	8.24	8.95	49.16	7.31	7.33	7.86	8.00	13.11	7.76	7.62	8.89
Detroit	7.32	8.43	9.38	43.50	7.49	7.55	8.08	8.04	13.25	7.90	7.73	8.91
Erie, Pa.	7.08	8.24	8.95[10]	....	7.31	7.35	...	8.10[10]	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	...	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.46	8.52	9.22	....	7.44	7.59	8.12	9.44	....	7.75	7.77	9.44
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.35	8.30	8.75	10.85
Milwaukee	7.22	8.33	9.19	....	7.30	7.36	7.89	7.94	13.14	7.60	7.54	8.81
Moline, Ill.	7.15	8.44	8.85	....	7.41	7.43	...	8.10	....	7.63	7.34	...
New York	7.78	8.88	9.63	53.13	8.23	8.16	8.71	9.77	13.47	8.11	8.21	9.50
Norfolk, Va.	7.35	...	...	....	7.80	7.85	...	9.95	....	8.10	7.60	9.10
Philadelphia	7.34	8.44	9.41	45.98	7.99	7.73	8.26	8.52	13.25	7.75	7.72	8.83**
Pittsburgh	7.13	8.24	9.40	49.00	7.21	7.27	7.80	8.00	13.05	7.43	7.45	8.72
Portland, Oreg.	7.80	8.80	10.65	....	8.00	7.95	...	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.25	...	9.49	....	7.85	7.85	...	9.50	....	8.10	7.50	9.35
St. Louis	7.42	8.53	9.69	43.89	7.50	7.56	8.09	8.29	13.34	7.83	7.74	9.01
St. Paul	7.46	8.59	9.16	....	7.72	7.74	...	8.51	13.51	7.94	7.65	9.12
San Francisco	8.20	9.65	10.15	51.65	8.35	8.15	8.70	11.45	14.35[3]	8.25	8.30	10.50
Seattle	7.85	10.50	10.90	54.00	8.90	8.60	9.15	12.25	14.65	8.50	8.50	10.70
Spokane	8.75	11.10[7]	10.90	....	8.90	8.60	9.15	12.25	15.40	8.50	8.50	11.20
Washington	7.78	9.80	8.60	....	8.49	8.24	...	9.40	....	8.51	8.11	9.56

*Prices do not include gage extras; †prices include gage and coating extras (based on 13.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ½-in.

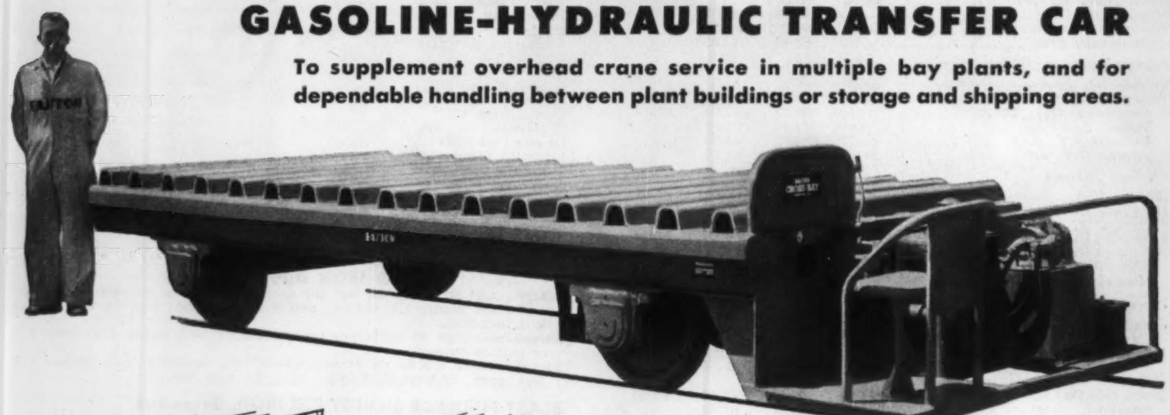
Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—100 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over; [10]—2000 lb and over

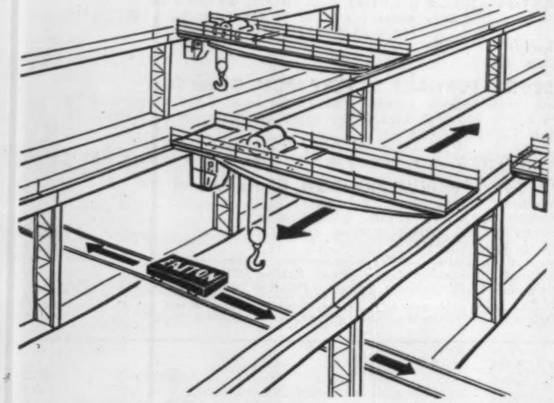
NEW

CROSS-BAY®

GASOLINE-HYDRAULIC TRANSFER CAR

To supplement overhead crane service in multiple bay plants, and for dependable handling between plant buildings or storage and shipping areas.

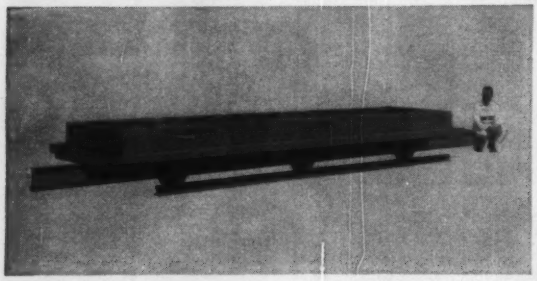




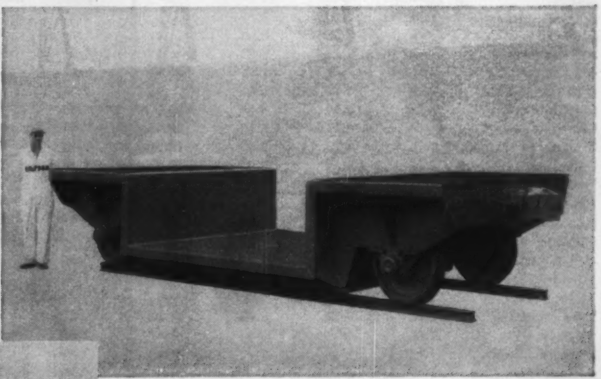
EASTON CROSS-BAY CARS are custom-built to meet speed and capacity requirements. Special superstructures can be designed for specialized or mechanized handling. The gasoline-hydraulic Cross-Bay Car illustrated above was built for steel warehouse work. It provides a capacity of 25 tons plus 50% for impact loading, and a two-way speed of 50 feet per minute.

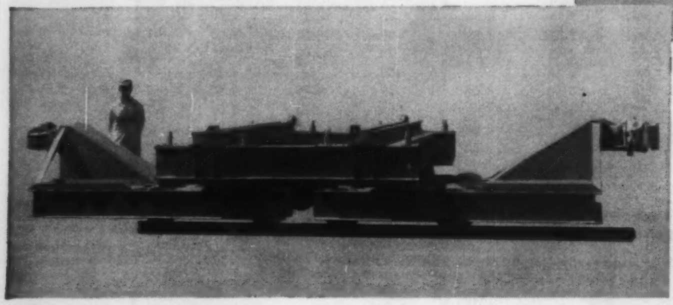
In addition to the gasoline-hydraulic car shown above Easton Cross-Bay Cars may be powered by electric motor, electro-fluid drive, gasoline-electric drive or storage battery. Capacities from 5 to 500 tons. Controls may be manual, electric (by push-button on the car or remote station) or electronic.

SEE EASTON FIRST FOR CUSTOM-BUILT CARS FOR INDUSTRY



Annealing Furnace Car Equipped with Rack Beam ▲





▲ Split-level Platform Car—Capacity 50 tons

◀ Double-truck Transformer Transfer Car —Capacity 150 tons

A-1049

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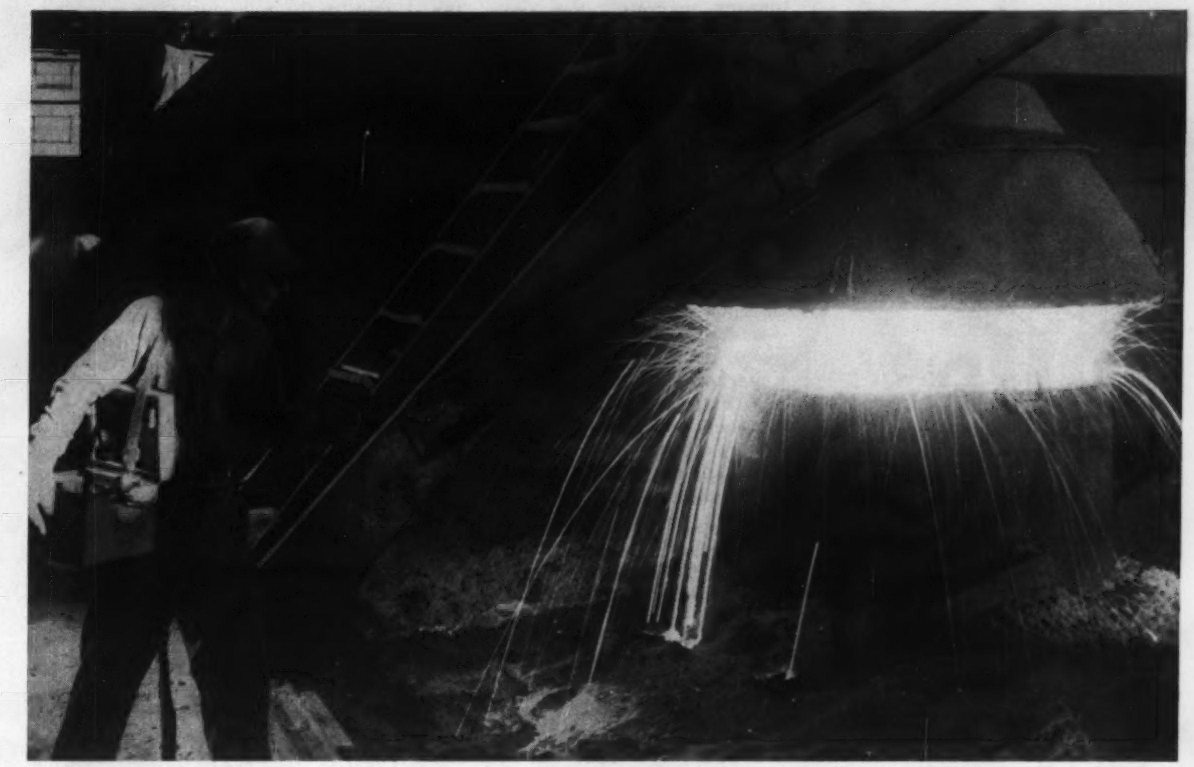


Molybdic oxide is being reduced in a thermite-type reaction at the Langeloth, Pa., plant of Climax Molybdenum Co. The final product is ferromolybdenum

Moly Faces Bright Future

Hopes for tonnage markets rest on finding new uses for metallic molybdenum. Missiles may be the answer. Supply and demand in 1956 will be at all-time peaks

MOLY never has looked better. Supply and demand for it in the free world this year is going to be in approximate balance at 63 million lb. That's exclusive of any government stockpiling, according to Arthur H. Bunker, president of Climax Molybdenum Co., New York. That will mean an increase of 7 million lb over consumption in 1955.

Climax feels that the future of moly is bright. Basically, the metal is an alloying element. Practically every one of the major industries using moly alloys is enjoying high-level operations and expects increases in the future. In the automotive field, which accounts for about 28 per cent of consumption, the outlook is especially good. Not only will increased production schedules mean greater consumption of the metal, but many auto makers are interested in it as a substitute for scarce nickel in carburizing steels. If this works out, it easily could double the automotive market for moly.

Bit by Bit—Because such a small amount of the metal is used in alloying applications, it takes a fairly significant upsurge in any one use to make a dent in the moly market. But in the aggregate, the market is considerable. Domestic shipments in 1955 were nearly 36 million lb of contained molybdenum (see table). Only about 700,000 lb of this was metallic molybdenum.

Consumption of molybdenum has been increasing at a rate even faster than that of alloy steel production, but some estimate of the future demand for the metal can be gained from anticipated demands for steel. During the last 20 years, steel capacity has increased on an average of 5 per cent annually; alloy steel has increased at a rate of 7½-per cent; stainless steel at 10 per cent. Over the next five years, steel capacity is expected to increase by 20 million tons, and it is reasonable to assume that molybdenum consumption will at least follow this increase.

High Hopes—It is in metallic moly that the industry hopes to realize

Shipments of Moly Products to Domestic Consumers

Year	Millions of lb*
1955	35.9
1954	23.7
1953	29.6
1952	30.2
1951	29.8
1950	32.7
1949	15.0
1944-1948 (avg)	23.7

*Contained molybdenum

Source: Bureau of Mines, U.S. Department of Interior

Now, more than ever, you can depend on

HANNA

as your best source for

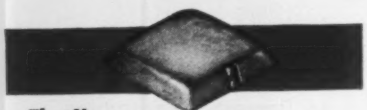
PIG IRON

- Our merchant capacity is bigger than ever
- Our plant is better than ever
- Our product range is greater than ever

It includes:

The HANNA 38-POUND PIG

The foundryman's favorite standard pig. Available in all grades, silvery and HannaTite. A good example of the quality that has made Hanna "the best known name in iron."



The New EXCLUSIVE HANNATEN INGOT

For 10-lb.-pig users, this new ingot means no free-carbon pockets, finer grain structure, more even melting. Available in all grades, silvery and HannaTite—an extra-close-grain iron.

THE HANNA FURNACE CORPORATION

Buffalo • Detroit • New York • Philadelphia

Merchant Pig Iron Division of

NATIONAL STEEL CORPORATION

tonnage markets. For years, the basic metal was produced by the powder metallurgy process. Today, it is made by the arc-cast method which results in higher density, larger sizes and lower gas content. Much money is being spent on research in the guided missile field, but, so far, moly has not gone beyond the experimental stage here.

Climax points out that it would take just one development—such as moly buckets on a new turbine for the intercontinental ballistics missile—to create a terrific market for the metal. (See page 112.) But such a market, even if it proves practical, is several years away.

Abundance—Supply is one of the brightest aspects of the picture. In contrast with the insufficient domestic reserves of some strategic metals, the U. S. produces more than enough moly to meet its needs—an important defense consideration. In 1955, it accounted for over 90 per cent of the free world's production. Reserves at Climax's huge mine in Colorado amount to 330 million tons of ore, maybe more. In addition, about a third of this country's production comes as a by-product of the copper industry. Kennecott Copper Co. accounts for the bulk of this production. Even though Climax plans to produce less moly this year than last (because of lower grade ore), the total supply still will increase because of stepped-up copper operations.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 169 & 170

While hot-rolled and cold-rolled sheets are in easier supply than they were earlier this year, and buyers are more discriminating in accepting mill offerings, demand for second quarter still exceeds supply. Producers haven't the slightest doubt they will be able to operate at full capacity through the second quarter. Not only will consumption be high, but consumers will take in whatever tonnage they can lay their hands on for inventory as a hedge against a possible strike and higher prices at midyear.

This protective covering may be at the expense of buying in the third quarter. Combining this effect with seasonal influences, the market in that period may be noticeably easier. However, steelmakers are not universally convinced there will be a sharp summer letdown.

Automotive sheet requirements have been down of late, but considerable tonnage continues to move to that consuming outlet. Auto makers have given mills some indication that their June needs will be down somewhat from April and May. Chicago area sheetmakers think the auto makers are accumulating inventory since car assemblies appear to be at a lower rate than steel receipts would indicate.

Despite the slower auto demand, other consuming outlets have taken up whatever slack has appeared in the market. This is notably true in domestic water heaters, drums, stoves, sanitary ware, refrigeration and air conditioning. In general, demand for hot and cold-rolled sheets is more active than was the case a month ago. Some pickup in galvanized sheet buying is noted, following a lag of several weeks. Enameling stock and electrical sheets also are in brisk demand and difficult to obtain for delivery this quarter.

Stainless Steel . . .

Stainless Steel Prices, Page 172

Auto makers are re-entering the market for stainless steel in the second quarter after cutting orders by as much as 20 per cent in March. They boosted orders for the second quarter when stocks of nickel-bearing stainless became depleted.

Producers say they can't fill all the orders for nickel-bearing stainless in this quarter. They are redoubling their efforts to persuade users to switch to substitute grades, but sales of the 200 series are lagging. Nonintegrated mills have difficulty getting enough nickel to meet demand for type 430, as well as for the 300 series.

Steel Bars . . .

Bar Prices, Page 168

Although under less pressure than they were late last year, hot-rolled carbon bars continue to move actively. There had been some spot openings in mill schedules due to automotive cutbacks, but producers have had no difficulty in disposing of the released tonnage—either by applying it to overages elsewhere or by offering it to buyers who could use it.

Producers say they will have all the tonnage they can handle in the current quarter, and some of them are confident there will not be much of a lag in demand during the third quarter.

Cold-finished carbon bars are moving well, and with processors able to obtain more hot stock, they can make better delivery promises. Cold finishers have opened books for the third quarter, but buying has been limited.

Midwest producers are in a more comfortable situation production and shipmentwise because of lower output in the automotive and farm equipment industries. This doesn't mean mills are in need of new business. Present order books assure full mill operations through the second quarter. Cold finishers are not so fully committed and have better inventories than they had a month or two ago.

Plates . . .

Plate Prices, Page 168

Most plate mills are out of the market entirely. They are booked up for the current quarter and haven't opened their books for the next contracting period. A few makers booking on a month-to-month basis still have some tonnage for distribution late this quarter, but it is indicated that all this tonnage is earmarked.

Plates in thicknesses of 1 in. and over will be in extremely tight supply through second quarter and beyond. Railroad and carshop needs are especially pressing. Construction requirements currently are rising. Considerable plate tonnage for construction is coming from the warehouses.

Fabricators on the West Coast, particularly in the Pacific Northwest, who have been seriously short of plates for some time, are planning to pool their orders in the hope they can be made more attractive to eastern mills. High freight charges work to the disadvantage of distant buyers when the mills can find plenty of orders close to home.

The George R. Marvin Co., Tacoma, Wash., is fabricating 25 storage tanks, involving 1200 tons of plates, for the U. S. Refinery Corp. which is erecting a plant on the Tacoma waterfront.

Tubular Goods . . .

Tubular Goods Prices, Page 172

Producers of oil country goods are encountering a heavy buying wave, and there may not be sufficient tonnage available to fill all orders now on books for second quarter shipment. This is especially true of high-alloy items. Several users have tried to place orders for high-alloy tubes for April or May shipment in the Pittsburgh area but have been unsuccessful.

To some extent the pickup in demand is seasonal. The construction season is beginning, and work soon will be getting under way in the oil fields of Canada and the Rocky Mountain area. All market men predict a record well drilling year.

Also, there's a rush to get orders on pipe mill books before prices go up, probably at midyear. Some users

This overcrowded family would have no such problem in Mississippi, where rapidly expanding new industry is finding plenty of room to grow. Also at hand is an abundance of raw materials, overnight delivery to hungry markets in the South, Southwest and Mississippi Valley, and willing, adaptable labor. Get the facts. You may want to join our growing industrial family.

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are ordering as much as 25 per cent more tonnage in the second quarter than they will require.

Cast iron pipe demand is reviving seasonally.

Warehouse . . .

Warehouse Prices, Page 173

Warehouse trading continues brisk. At Philadelphia, the distributors say they could sell more plates, structurals and sheets if more tonnage of these products were available to them. The situation in hot-rolled bars is almost as tight, although warehouse inventories in this item are in better shape than they were some time back.

Most of the smaller warehouses have trouble stocking enough sheet and plate to meet the expected late-second-quarter order rush. The larger distributors are ordering in heavy quantity, taking advantage of any softening in supply conditions at the mill level resulting from the slower automotive demand. Auto cutbacks permitted slightly larger allotments of sheets for April. But supplies appear to be tightening up again.

Price increases in the metropolitan New York market average 80 cents to $1 per ton, quotations being adjusted to the recently effected higher freight rates. Sales volume for first quarter in the area approximated that in the preceding three-month period but would have been higher had structurals and plates been in more plentiful supply.

Pig Iron . . .

Pig Iron Prices, Page 173

Pig iron price increases of $1.50 per ton, initially effected Mar. 25 by Colorado Fuel & Iron Corp. and subsidiaries, are general except for the South. The higher prices reflect the increase in Lake Superior iron ore prices effected at the opening of the year.

Some consumers sought to cover their forward requirements prior to the price increase, but little in the way of inventory building was possible. There has been some leveling off in merchant iron demand since the price increase, but shipments are brisk, with foundries generally operating at a good clip.

Structural Shapes . . .

Structural Shape Prices, Page 168

February structural steel bookings at 328,595 tons represented a sharp drop from the all-time monthly high reported for January, says the American Institute of Steel Construction. Still bookings in the month were 40 per cent above those in February, 1955. Cumulative bookings in the first two months of 1956 ran 54 per cent ahead of those for the corresponding two months of 1955. Revised figures for January were 405,396 tons.

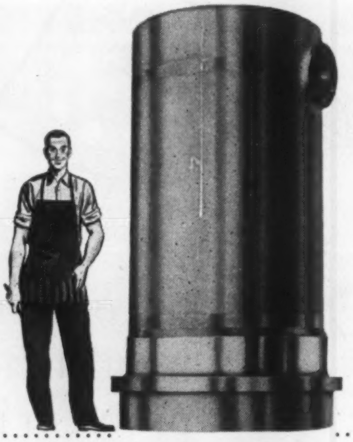
Shipments of 283,379 tons in February were ahead of the revised January figure of 251,498 tons. February shipments were 33 per cent above those in the like month a year ago and equaled the October 1955 movement, which was the second highest last year. Cumulative shipments this year run 22 per cent ahead of the corresponding two months of last year.

Order backlog at the end of February was 2,476,187 tons. This shows a slight rise from the preceding month.

In the East, structural work is active with orders again more numerous, including substantial bridge work. Recently, the Richmond-Petersburg Turnpike Authority, Virginia, closed on 19,800 tons to two fabricators for miscellaneous bridge construction. Industrial construction is livelier in the area, and considerable institutional work is going ahead, including hospitals and schools.

Prospective work includes a 60-story skyscraper for the Chase Man-

Need Large Hydraulic Cylinders?



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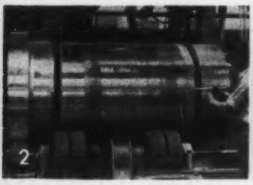

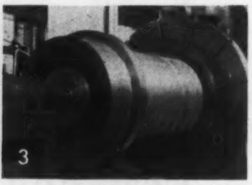

Hydraulic cylinders combining the advantages of thoroughly hot worked steel and clean automatic welding are being furnished by Titusville. Such cylinders insure the user of better physical characteristics (hollow forged shell and flanged sections together with upset forged top or dome sections), freedom from leakage under pressure because of porosity and the complete elimination of costly repairs or rejections. Fabrication is shown in photos above.

1. Hollow forging for shell section being hot worked on mandrel.
2. Hollow and upset forgings assembled for automatic welding.
3. Complete welded cylinder being rough turned in 80" engine lathe.

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hattan Bank in lower Manhattan. Requiring an estimated 45,000 tons of structurals, this building is scheduled for completion in three years.

In New England, bridge contracts are off temporarily. Thus far this year, area contracts total close to 70,000 tons. Estimating for industrial expansion and schools in the district is heavier.

Chief concern of fabricators pertains to the shortage of structurals, especially wide flange sections. These are in even tighter supply than recently because of tonnage lost due to a wildcat strike at Bethlehem's Saucon mills.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

19,800 tons, bridge work, Richmond-Petersburg Turnpike Authority, Virginia; 11,800 tons to Bethlehem Steel Co., Bethlehem, Pa., and 8000 tons to the American Bridge Division, U. S. Steel Corp., Pittsburgh; the American Bridge tonnage is for a bridge over the James river at Richmond; the Bethlehem tonnage comprises 1800 tons for a bridge over the Appomattox river, Petersburg, and 10,000 tons of other miscellaneous bridge work.

3335 tons, disturbed patients building, Kings Park Hospital, Long Island, N. Y., through Cauldwell-Wingate Co., general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

3300 tons, galvanized transmission towers, New Orleans, placed by Ebasco Services Inc., New York, with the Muskogee Iron Works, Muskogee, Okla.

2750 tons, Hampton Creek and Eastbrook Creek bridge and approaches, Hampton Roads project, Virginia, to American Bridge Division, U. S. Steel Corp., Pittsburgh; Bowers Construction Co., Raleigh, N. C., general contractor.

2200 tons, 26-story Canadian House, Fifth avenue and 54th street, New York, through Walsh Construction Co., to American Bridge Division, U. S. Steel Corp., Pittsburgh; until recently it was planned to erect this building of reinforced concrete due to the shortage of shapes; American Bridge, however, has been able to give satisfactory shape delivery due to a schedule opening.

2000 tons, recovery process furnace, including 210-ft smokestack, to Combustion Engineers Inc., by Longview Fibre Co., Longview, Wash.

1650 tons, five grade separations, Connecticut turnpike project 316-01, Bridgeport, to Harris Structural Steel Co., New York; Cayuga Foundation Co., New York, general contractor.

1600 tons, Milliken electric station, Ludlowville, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

1250 tons, eight grade separation structure, Connecticut turnpike project 302-02, Greenwich, to Phoenix Bridge Co., Phoenixville, Pa.; Slattery Contracting Co., New York, general contractor.

1100 tons, foundling hospital, Third avenue and 69th street, New York, through Eggers & Higgins, to the Grand Iron Works, Bronx, New York.

1000 tons, state bridge work, Lenhartsville, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

900 tons, boiler supports, Combustion Engineering Inc., Morro Bay, Calif., to the Maxwell Steel Co., Ft. Worth, Tex.

800 tons, eight-plane hangar, Moses Lake, Wash., for Boeing Airplane Co., Seattle, to Isaacson Iron Works, Seattle; Howard S. Wright & Co. Inc., Seattle, general contractor.

750 tons, two cranes, Boston Navy Yard, to Star Iron & Steel Co., Tacoma, Wash.

750 tons, boiler supports, Combustion Engineering Inc., Strang, Tex., to Maxwell Steel Co., Ft. Worth, Tex.

500 tons, plant building, American Cyanamid Co., Wallingford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

425 tons, including long span joists, High school, Sharon, Mass., to Groisser & Shlager Iron Works, Somerville, Mass., $145,850 f.o.b. Sharon; bids direct.

400 tons, Rayonier plant expansion, Hoquiam, Wash., to Star Iron & Steel Co., Tacoma, Wash.

300 tons, 765-ft Willamette river bridge, Oregon state project, to unstated interest; general contract to Hamilton & Thomas, Eugene, Oreg., low at $414,891.

235 tons, junior high school, Simsbury, Conn., to Haarmann Steel Co., Holyoke, Mass.; A. E. Stephens Co., Springfield, Mass., general contractor; 65 tons, reinforcing bars, Bethlehem Steel Co., Bethlehem, Pa.

205 tons, elementary school, Church street, White Plains, N. Y., through Riverso Construction Co., general contractor, to Central Iron Works, Bronx, New York.

200 tons, Puyallup, Wash., junior high school, to Star Iron & Steel Co., Tacoma, Wash.

150 tons, boiler supports, California Electric Power Co., Riverside, Calif., through Combustion Engineering Inc., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

100 tons, Weyerhaeuser pulp plant, Cosmopolis, Wash., to Star Iron & Steel Co., Tacoma, Wash.

STRUCTURAL STEEL PENDING

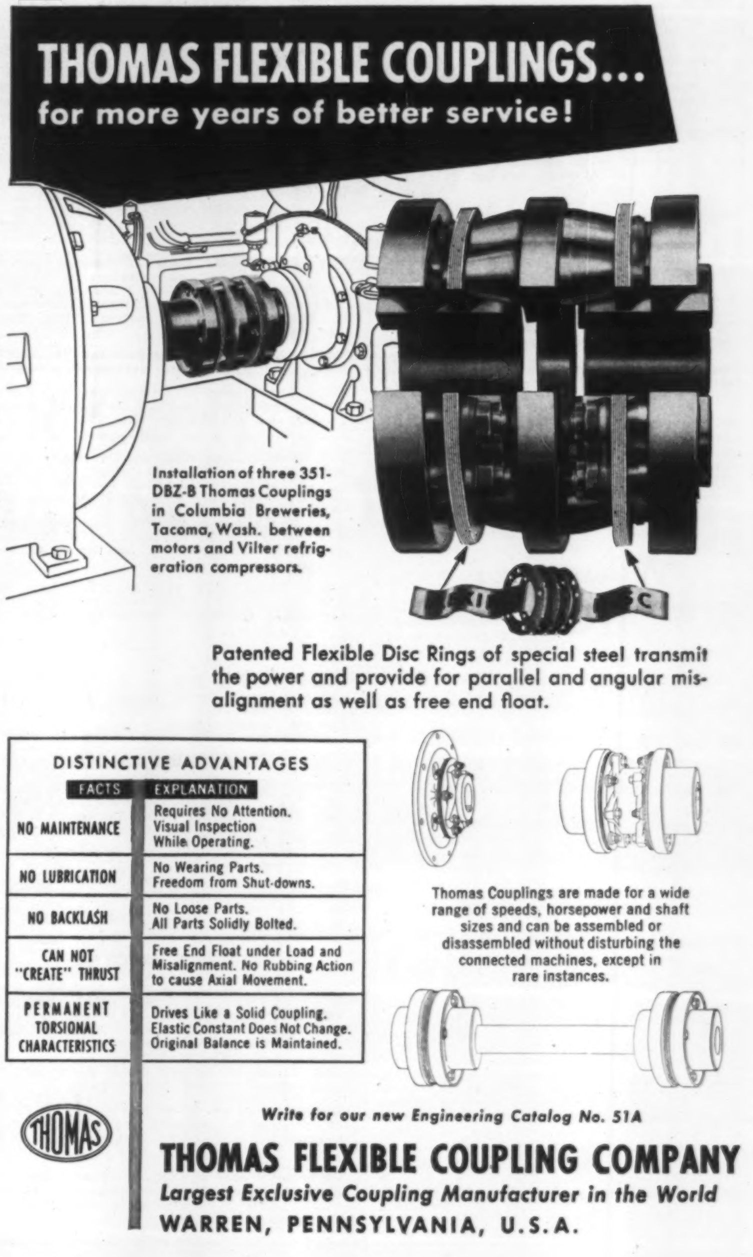
5000 tons, catapult and arresting equipment, Navy, Lakehurst, N. J., Roscoe Engineering Co., Washington, awarded general contract.

4000 tons, approaches to two Portland, Oreg., bridges; bids postponed from Mar. 27 to Apr. 10, to Multnomah county commissioners.

900 tons, plant addition, Armco Steel Corp., Ashland, Ky., to Mississippi Valley Structural Steel Co., Decatur, Ill.

500 tons, permanent structural supports. Trinity dam diversion tunnel; bids Apr. 4, Department of the Interior, Weaversville, Calif.

470 tons, junior high school, Ardmore, Pa.;



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NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $96.50; 19-21% Mn, 1-3% Si, $94; 16-19% Mn, $92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Preminum for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight alowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%. Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02% max 38.50c, 0.03% max 38c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed. c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.
Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c, less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½ in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 200 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base; carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

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Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00

Brazilian iron ore, 68-69% 13.00c, f.o.b. Victoria.

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$34.00-$34.50
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, delivery within six months, $1.15 nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.05 nom.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.10

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Birmingham, ovens	$25.65
Cincinnati, deld.	30.58
Buffalo, ovens	27.50
Buffalo, deld.	28.75
Camden, N. J., ovens	26.50
Chicago, ovens	27.00
Chicago, deld.	28.50
Detroit, ovens	27.50
Detroit, deld.	28.50
Pontiac, deld.	29.06
Saginaw, deld.	30.58
Erie, Pa., ovens	27.50
Everett, Mass., ovens New England, deld.	*28.55
Indianapolis, ovens	26.75
Ironton, O., ovens	26.00
Cincinnati, deld.	28.59
Kearny, N. J., ovens	26.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	27.50
Neville Island, (Pittsburgh) Pa., ovens	26.25
Painesville, O., ovens	27.50
Cleveland, deld.	29.43
Philadelphia, ovens	26.50
St. Louis, ovens	28.50
St. Paul, ovens	26.50
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 1525.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Inches		Per
Diam	Length	100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25
	CARBON	
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Frank H. Wilson, that city, low on general contract.

250 tons, department store addition, Tacoma, Wash.; general bids in.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2675 tons, ten grade separation structures, Connecticut turnpike project 304-02, Stamford, to Bethlehem Steel Co., Bethlehem, Pa.; Gull Contracting Corp., Flushing, N. Y., general contractor; 3965 tons, steel piles, to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, eight grade and two drainage structures, Connecticut turnpike project 302-02, Stamford, to Carroll-McCreary Co. Inc., Brooklyn, N. Y.; Slattery Contracting Co., New York, general contractor; 1150 tons, steel piles, to Bethlehem Steel Co., Bethlehem, Pa.

700 tons, Hampton Creek and Eastbrook Creek bridges and approach, Hampton Roads project, Virginia, to Virginia Steel Co., Richmond, Va.; Bowers Construction Co., Raleigh, N. C., general contractor.

300 tons, Wesley Gardens Rest Home, Des Moines, Wash., to Northwest Steel Rolling Mills Inc., Seattle.

230 tons, Blue Cross building, Birmingham, to Ceco Steel Products Co., Birmingham; Daniel Construction Co., Birmingham, general contractor.

REINFORCING BARS PENDING

1755 tons, sheet piling, Hartwell, Ga.; Corps of Engineers, Savannah, Ga.

1120 tons, flood control work, Knoxville, Tenn.; bids Apr. 11, city of Knoxville.

350 tons, Weyerhaeuser Timber Co., office building, Tacoma, Wash.; general contract awarded.

125 tons, Washington state highway projects, Grays Harbor county; bids to Olympia, Wash., Apr. 17.

120 tons, state highway project, Westmoreland-Walpole, N. H.

100 tons, foundations for refinery plant, Tacoma, Wash., for U. S. Refinery Corp.; bids to Frank Darrow, Tacoma, Wash.

100 tons, also trash racks and other structurals, diversion tunnel, Cougar dam project, McKenzie river; bids to U. S. Engineer, Portland, Oreg., Apr. 27.

PLATES . . .

PLATES PLACED

1200 tons, 25 oil storage tanks, for U. S. Refinery Corp., Tacoma, Wash., to George R. Marvin Co., Tacoma.

600 tons, 24 storage tanks for Elmendorf Air Base, Alaska, to Wyatt & Kipper, Seattle; general contract to M. B. Contracting Co., Seattle.

300 tons, various tank jobs, to Wyatt & Kipper, Seattle.

100 tons, 1-million-gallon storage tank for Pacific Molasses Co., Tacoma, Wash., to George R. Marvin Co., Tacoma.

PLATES PENDING

325 tons, low alloy, Rock Island, Ill., arsenal; bids in.

300 tons, elevated 500,000-gallon water storage tank; bids Apr. 10, Arlington, Va.

PIPE . . .

CAST IRON PIPE PENDING

144 tons, various sizes; bids to Seaside, Oreg., Apr. 9.

90 tons, system improvement; bids to Tumwater, Wash., Apr. 3.

83 tons, system improvement; bids to Puyallup, Wash., Apr. 2.

STEEL PIPE PENDING

Unstated, 22,000 ft, 10, 8 and 6 in.; bids to Olympic View Water District, 23725 Edmonds Way, Edmonds, Wash., Apr. 9.

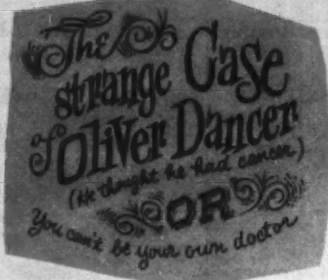
RAILS, CARS . . .

RAILROAD CARS PLACED

Boston & Maine, 350 gondolas, to be rebuilt at the company's Concord, Mass., shops.

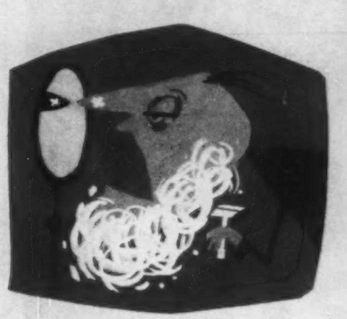
RAILROAD CARS PENDING

Hudson & Manhattan, 50 TP lightweight, air-conditioned cars; court authority granted for solicitation of bids.


The strange Case of Oliver Dancer
(He thought he had cancer)
OR
You can't be your own doctor

1. This is the story of an ordinary man . . . worked from 9:00 to 5:00 . . . raised hamsters in his spare time . . . steered clear of doctors.

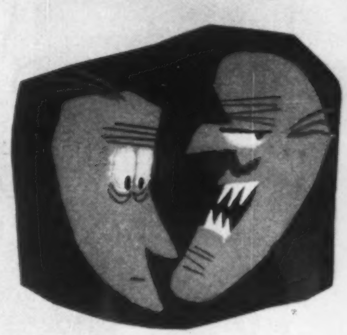
2. Oliver did twenty push-ups every morning . . . took long bracing walks in the fresh air . . . made sparing use of condiments and stimulants.



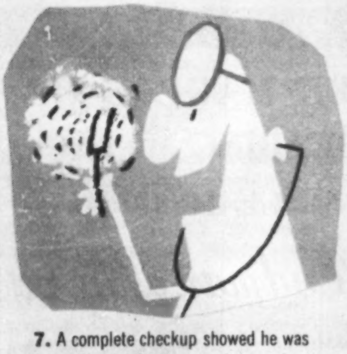
3. Then one day while he was shaving, he noticed a small lump. An icy hand reached out and clutched at his heart . . . This was it—CANCER!

4. Overnight Oliver became a changed man. He gave his hamsters to a neighbor, bought a small harp and a booklet entitled "Harp-playing for Beginners."

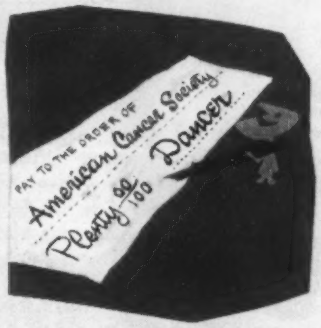
5. Instead of taking long bracing walks, he tottered into his lawyer's office, cut two nephews out of his will and hastily added a couple of codicils.



6. His lawyer, a man of real intuition, knew that where there's a will there's a way, and firmly bullied Dancer into seeing a doctor.



7. A complete checkup showed he was in perfect health, except for a minor tone deafness that would preclude much skill with the harp.


PAY TO THE ORDER OF
American Cancer Society
Plenty 00/100
Dancer

8. Dancer was so overjoyed he promptly went home and made out a very large check to the American Cancer Society, and that's what you should do, too.

AMERICAN CANCER SOCIETY

Gentlemen:

I WANT TO HELP CONQUER CANCER

☐ Please send me free information about Cancer.

☐ Enclosed is my contribution of $.......... to the Cancer Crusade.

NAME..........................

ADDRESS......................

CITY............... STATE.....

9. (MAIL TO: CANCER, c/o your town's Postmaster.) Help others and help yourself. Fight Cancer with a checkup and a Check.

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You save two ways when you specify Freeway Washers. First . . . they cost less, thanks to our exclusive method of processing. And second . . . they CONSISTENTLY "meet the specs", to minimize assembly time. We'll gladly quote on your next order . . . and prove these two BIG savings to you!

Freeway semi-precision ball bearings give you positive anti-friction protection . . . for just pennies per bearing. Patented design cuts installation time up to 78%. Send for descriptive literature today.

Freeway "one-hit" stampings are blanked, formed and trimmed in a single operation. You're assured substantial savings on small parts adaptable to this unique type of production. Details available upon request.

Freeway
WASHER & STAMPING COMPANY

P. O. Box 1756, Cleveland 5, Ohio

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( ) Washers, ( ) Bearings, ( ) Stampings.

Company. . . . .

Street. . . . .

City . . . . State. . . . .

Signature. . . . .

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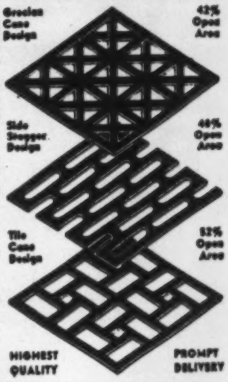

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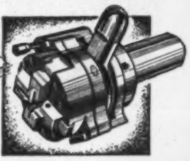

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Scrap . . .

Scrap Prices, Page 186

Pittsburgh—A mill on the fringe of the Pittsburgh district bought No. 1 heavy melting at a price equivalent to $55 in Pittsburgh. It's increasingly difficult to get good No. 1 steel. With the latest purchase, the spread widened between No. 1 and No. 2 heavy melting. In the same transaction, $47 was paid for No. 2 heavy melting and $45 for No. 2 bundles. Railroad scrap prices stiffened in early April. Quotations on those grades average $2 a ton higher this week.

Philadelphia — Recent sharp price advances have loosened the flow of scrap. As a result, a general leveling off of the market is seen. Quotations on all grades are unchanged, except for an advance in electric furnace bundles to $56, delivered.

Cleveland—A Detroit broker's purchase of No. 1 production bundles here at $62 has forced the scrap market up another couple of dollars. None of the purchase, it is said, will go to mills here or in the Valley. The supposition is that it is destined for the Pittsburgh district. Currently, No. 1 heavy melting is quoted here at $55.50-$56.50, but this price is largely nominal since no local mill purchases were reported last week. Recently, a local mill paid up to $58 for a special lot of production scrap, but it is understood this lot was for consumption in another district. Heavy melting is quoted $58-$59 in the Valley.

Boston—The increase in prices on the primary steel grades has boomed prices to almost the peak level of early this year. Secondary grade advances are less spectacular, although substantial. Differentials in brokers' buying prices, shipping point, for heavy melting steel range up to $10 a ton. This strength is not reflected in the cast grades. Export buying is a negligible factor in the current market advance, which is based primarily on demand from eastern Pennsylvania and some pickup in district mill buying.

New York—Brokers have advanced buying prices on No. 1 heavy melting steel and No. 1 bundles to $47-$48, and on No. 2 bundles to $35-$36. No. 2 heavy melting continues unchanged. Brokers also have boosted prices on machine shop turnings to $29.50-$30.50; mixed borings and turnings to $31-$32; and on short shoveling turnings to $33-$33.50. Prices on low phos scrap and cast iron grades are steady.

Buffalo—A leading consumer purchased steel grades for April delivery at price increases averaging $3 a ton. It paid $53 for No. 1 heavy melting, $42 for No. 2 and $39 for No. 2 bundles. Cupola cast scrap advanced $1 to $50. Low phos is quoted $2 higher at $55 and railroad specialties are up $2 to $58.

Cincinnati — Demand continues strong, and prices are moving upward. The flow of production scrap from auto plants is noticeably restricted. Consumers are turning to more dealer scrap as a result.

Detroit—The scrap market is strong here, primarily because there is not enough metal available in the Detroit area to satisfy all the demands from local consumers. Prices are quoted higher and are still rising.

St. Louis—Brokers' buying prices continue to soar. Increases last week ranged up to $5 for unstripped motor blocks. In general, advances ranged between $2 and $3. Rerolling rails zoomed to $71, and the cast iron grades rose sharply.

Chicago — Upward pressure on scrap continues but at a more moderate pace than a week ago. A few of the leading steel grades were marked up. Advances averaged $1 and apply to No. 1 heavy melting,

(Please turn to page 188)

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CO.

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BLUE TEMPERED
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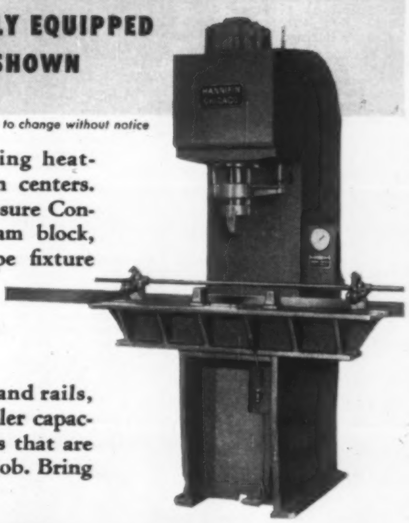

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HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 4	$54.17
Mar. 28	53.50
Mar. Avg.	50.21
Apr. 1955	36.73
Apr. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania

PITTSBURGH

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*46.00-47.00*
No. 1 bundles	*54.00-55.00*
No. 2 bundles	*44.00-45.00*
No. 1 busheling	*54.00-55.00*
Machine shop turnings	36.00-37.00
Mixed borings, turnings	36.00-37.00
Short shovel turnings	40.00-41.00
Cast iron borings	40.00-41.00
Cut structurals, 3 ft lengths	59.00-60.00
Heavy turnings	46.00-47.00
Punching & plate scrap	59.00-60.00
Electric furnace bundles	53.00-54.00

Cast Iron Grades

No. 1 cupola	51.00-52.00
Charging box cast	47.00-48.00
Heavy breakable cast	47.00-48.00
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	56.00-57.00

Railroad Scrap

No. 1 R.R. heavy melt.	*59.00-60.00*
Rails, 2 ft and under	*70.00-71.00*
Rails, 18 in. and under	*71.00-72.00*
Rails, random lengths	*65.00-66.00*
Railroad specialties	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	**330.00-340.00**
18-8 turnings	**225.00-235.00**
430 bundles & solids	**110.00-120.00**
430 turnings	**60.00-65.00**

CLEVELAND

No. 1 heavy melting	*55.50-56.50*
No. 2 heavy melting	*48.00-49.00*
No. 1 bundles	*55.50-56.50*
No. 2 bundles	*41.00-42.00*
No. 1 busheling	*55.50-56.50*
Machine shop turnings	**29.00-30.00**
Mixed borings, turnings	**33.00-34.00**
Short shovel turnings	**33.00-34.00**
Cast iron borings	**33.00-34.00**
Low phos.	*59.00-60.00*
Cut structural plates 2 ft and under	*62.00-63.00*
Alloy free, short shovel turnings	**37.00-38.00**
Electric furnace bundles	*56.00-57.00*

Cast Iron Grades

No. 1 cupola	*56.00-57.00*
Charging box cast	*49.00-50.00*
Stove plate	*54.00-55.00*
Heavy breakable cast	*48.00-49.00*
Unstripped motor blocks	*32.00-33.00*
Brake shoes	*42.00-43.00*
Clean auto cast	*56.00-57.00*
Burnt cast	*43.00-44.00*
Drop broken machinery	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*56.00-57.00*
R.R. malleable	*62.00-63.00*
Rails, 2 ft and under	*72.00-73.00*
Rails, 18 in. and under	*72.00-73.00*
Rails, random lengths	*68.00-69.00*
Cast steel	*61.00-62.00*
Railroad specialties	*61.00-62.00*
Uncut tires	*62.00-63.00*
Angles, splice bars	*67.00-68.00*
Rails, rerolling	*70.00-71.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	**345.00-355.00**
18-8 turnings	**205.00-215.00**
430 clips, bundles, solids	**105.00-115.00**
430 turnings	**55.00-65.00**

YOUNGSTOWN

No. 1 heavy melting	*58.00-59.00*
No. 2 heavy melting	*44.00-45.00*
No. 1 bundles	*58.00-59.00*
No. 2 bundles	*41.00-42.00*
No. 1 busheling	*58.00-59.00*
Machine shop turnings	**29.00-30.00**
Short shovel turnings	**34.00-35.00**
Cast iron borings	**34.00-35.00**
Low phos.	*59.00-60.00*
Electric furnace bundles	*59.00-60.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*59.00-60.00*

CHICAGO

No. 1 heavy melting	*53.00-56.00*
No. 2 heavy melting	*44.00-45.00*
No. 1 factory bundles	*57.00-58.00*
No. 1 dealer bundles	*54.00-55.00*
No. 2 bundles	40.00-41.00
No. 1 busheling	*53.00-56.00*
Machine shop turnings	*31.00-32.00*
Mixed borings, turnings	*33.00-34.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*33.00-34.00*
Cut structurals, 3 ft	*57.00-58.00*
Punchings & plate scrap	*58.00-59.00*

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Stove plate	*44.00-45.00*
Unstripped motor blocks	*40.00-41.00*
Clean auto cast	*55.00-56.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt.	57.00-58.00
R.R. malleable	63.00-64.00
Rails, 2 ft and under	71.00-72.00
Rails, 18 in. and under	72.00-73.00
Angles, splice bars	66.00-67.00
Rails, rerolling	72.00-73.00

Stainless Steel Scrap

18-8 bundles & solids	**345.00-360.00**
18-8 turnings	**250.00-260.00**
430 bundles & solids	**105.00-110.00**
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*50.00*
No. 2 heavy melting	*36.00*
No. 1 bundles	*50.00*
No. 2 bundles	*37.00*
No. 1 busheling	*50.00*
Machine shop turnings	*23.00*
Mixed borings, turnings	*23.00*
Short shovel turnings	*28.00*
Punchings & plate scrap	*62.00*

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	38.00
Stove plate	38.00
Heavy breakable	37.00
Unstripped motor blocks	26.00
Clean auto cast	49.00
Malleable	44.00

BIRMINGHAM

No. 1 heavy melting	**37.00-38.00**
No. 2 heavy melting	**34.00-35.00**
No. 1 bundles	**37.00-38.00**
No. 2 bundles	*29.00-30.00*
No. 1 busheling	**37.00-38.00**
Cast iron borings	**21.00-22.00**
Short shovel turnings	**27.00-28.00**
Machine shop turnings	**26.00-27.00**
Electric furnace bundles	**42.00-43.00**

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	**47.50-48.00**
Stove plate	**44.50-45.50**
Bar crops and plate	**51.00-52.00**
Structural & plate, 2 ft.	**49.00-50.00**
Unstripped motor blocks	**37.00-38.00**
Charging box cast	**32.00-33.00**
No. 1 wheels	**37.00-38.00**

Railroad Scrap

No. 1 R.R. heavy melt.	**47.00-48.00**
Rails, 18-in. and under	*62.00-63.00*
Rails, rerolling	*62.00-63.00*
Rails, random lengths	*60.00-61.00*
Angles, splice bars	*58.00-59.00*

PHILADELPHIA

No. 1 heavy melting	53.50
No. 2 heavy melting	46.00
No. 1 bundles	53.50
No. 2 bundles	44.00
No. 1 busheling	53.50
Electric furnace bundles	*56.00*
Mixed borings, turnings	36.00
Machine shop turnings	36.00-37.00
Short shovel turnings	39.00-40.00
Heavy turnings	49.00-50.00
Structurals & plates	57.00-58.00
Couplers, springs, wheels	60.00
Rail crops, 2 ft & under	65.00-66.00

Cast Iron Grades

No. 1 cupola	**49.00-50.00**
Malleable	**68.00**
Heavy breakable cast	**53.00**
Drop broken machinery	**55.00**

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	39.00-40.00
No. 1 bundles	*47.00-48.00*
No. 2 bundles	*35.00-36.00*
Machine shop turnings	*29.50-30.50*
Mixed borings, turnings	*31.00-32.00*
Short shovel turnings	*33.00-33.50*
Low phos. (structural & plate)	48.00-50.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Unstripped motor blocks	31.00-33.00
Heavy breakable	**46.00-47.00**

Stainless Steel

18-8 sheets, clips solids	**320.00-325.00**
18-8 borings, turnings	**150.00-160.00**
430 sheets, clips, solids	**120.00-125.00**
410 sheets, clips, solids	**100.00-105.00**

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*46.00-46.50*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*46.00-46.50*
No. 2 bundles	*33.50-34.00*
No. 1 busheling	*45.50-46.00*
Machine shop turnings	*27.00-27.50*
Mixed borings, turnings	*28.00-28.50*
Short shovel turnings	*30.00-31.00*
No. 1 cast	**40.50-41.00**
Mixed cupola cast	**38.00-39.00**
No. 1 machinery cast	**42.00-43.00**

BUFFALO

No. 1 heavy melting	*52.00-53.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*52.00-53.00*
No. 2 bundles	*38.00-39.00*
No. 1 busheling	*52.00-53.00*
Mixed borings, turnings	*31.00-32.00*
Machine shop turnings	*30.00-31.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*31.00-32.00*
Low phos.	*54.00-55.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*49.00-50.00*
No. 1 machinery	**51.00-52.00**

Railroad Scrap

Rails, random lengths	**58.00-59.00**
Rails, 3 ft and under	**64.00-65.00**
Railroad specialties	*57.00-58.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*53.00-54.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*53.00-54.00*
No. 2 bundles	*39.50-40.50*
No. 1 busheling	*53.00-54.00*
Machine shop turnings	*33.50-34.50*
Mixed borings, turnings	*33.50-34.50*
Short shovel turnings	*35.50-36.50*
Cast iron borings	*33.50-34.50*
Low phos., 18 in.	*57.00-58.00*

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Heavy breakable cast	*45.00-46.00*
Charging box cast	*45.00-46.00*
Drop broken machinery	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00-55.00*
Rails, 18 in. and under	*69.00-70.00*
Rails, random lengths	*61.00-62.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*45.00*
No. 2 heavy melting	*42.50*
No. 1 bundles	*45.00*
No. 2 bundles	*38.50*
No. 1 busheling	45.00
Machine shop turnings	28.00
Short shovel turnings	29.50

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	*45.00*
Heavy breakable cast	*43.00*
Unstripped motor blocks	*43.00*
Brake shoes	*45.00*
Clean auto cast	*49.00*
Stove plate	42.00

Railroad Scrap

No. 1 R.R. heavy melt.	*56.00*
Rails, 18 in. and under	69.00
Rails, random lengths	*65.50*
Rails, rerolling	*71.00*
Angles, splice bars	*62.00*

SEATTLE

No. 1 heavy melting	*39.00*
No. 2 heavy melting	33.00-35.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 3 bundles	17.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, bundles	52.00-55.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	42.00
Heavy breakable cast	33.00
No. 1 wheels	35.00
Unstripped motor blocks	30.00
Clean motor blocks	35.00
Stove plate (f.o.b. plant)	30.00
Brake shoes	30.00

Railroad Scrap

Rails, random lengths	38.00

LOS ANGELES

No. 1 heavy melting	*38.00*
No. 2 heavy melting	*32.00*
No. 1 bundles	*37.00*
No. 2 bundles	*28.00*
Machine shop turnings	*17.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*42.00*

SAN FRANCISCO

No. 1 heavy melting	**36.00**
No. 2 heavy melting	**30.00**
No. 1 bundles	**35.00**
No. 2 bundles	**26.00**
No. 1 busheling	**36.00**
Machine shop turning	**20.00-23.00**
Mixed borings, turnings	**20.00-23.00**
Cast iron borings	**20.00-23.00**
Short shovel turnings	**25.00**
Cut structurals	**45.00**
Heavy turnings	**20.00-23.00**
Punchings & plate scrap	**44.00**

Cast Iron Grades

No. 1 cupola	**45.00**
Charging box cast	**35.00**
Stove plate	**39.00**
Heavy breakable cast	**36.00**
Unstripped motor blocks	**32.00**
Brake shoes	**35.00**
Clean auto cast	**45.00**
No. 1 wheels	**39.00**
Burnt cast	**23.00**
Drop broken machinery	**50.00**

HAMILTON, ONT.

No. 1 heavy melting	**45.50**
No. 2 heavy melting	**41.50**
No. 1 bundles	**45.50**
No. 2 bundles	**38.00**
Mixed steel scrap	**38.00**
Mixed borings, turnings	**19.00**
Rails, remelting	**54.50**
Busheling, new factory: Prepared	**43.50**
Busheling, new factory: Unprepared	**39.50**
Short steel turnings	**27.50**

Cast Iron Grades†

No. 1 machinery cast	**42.00-45.00**

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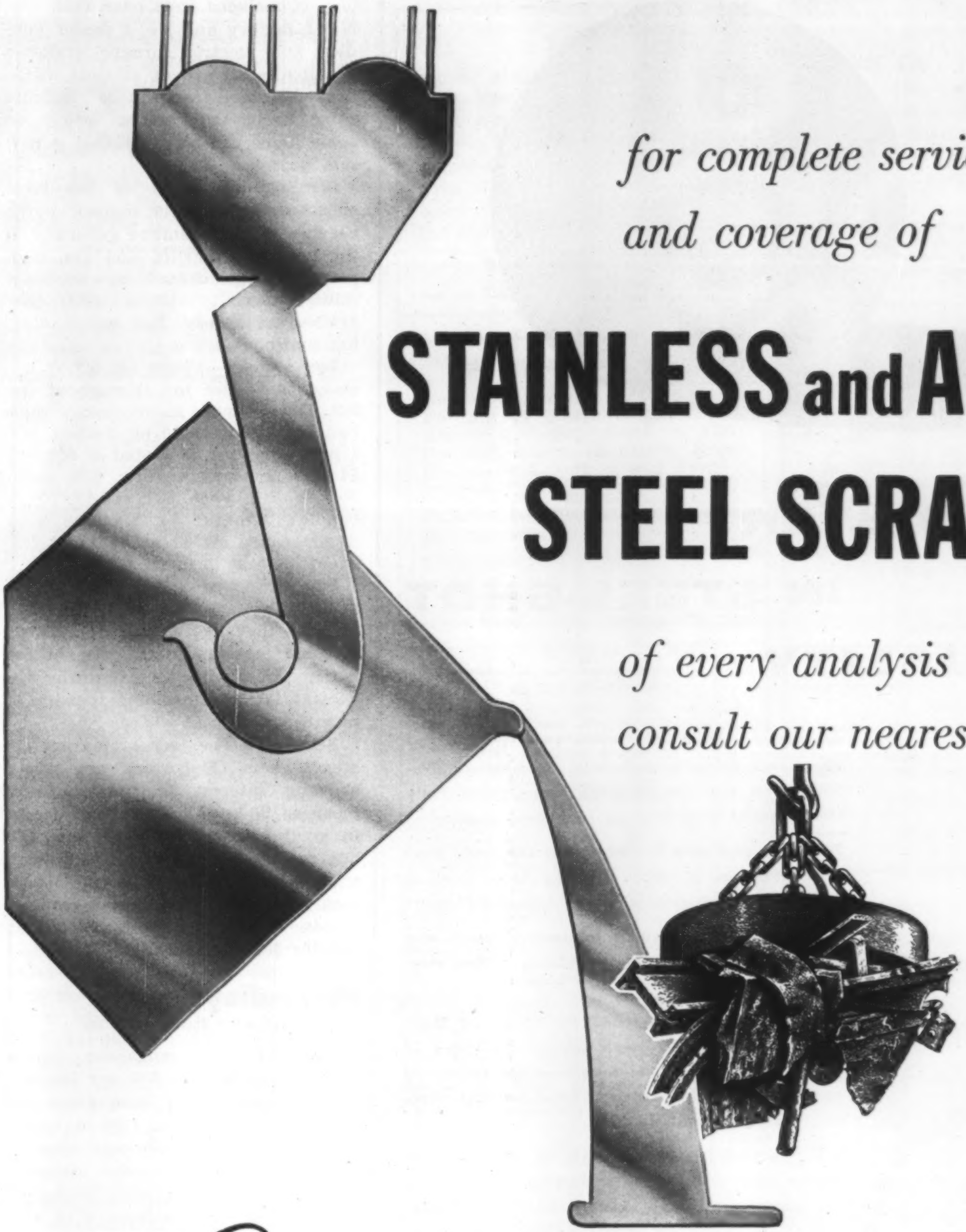
†F.o.b., shipping point.



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Sold and recommended by
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(Concluded from page 185)

No. 1 factory and No. 1 dealer bundles and electric furnace grades—practically all are at all-time highs. broker-dealer transactions indicate some doubt that present prices on some items can be duplicated in new mill buying.

Birmingham — Bulk of the local open-hearth scrap is moving north because of slow demand generally in the southern market and the high prices being offered by northern mills. Specialty items and cast grades are steady. The export market continues active.

Los Angeles—Prices are off an average of $4 per ton throughout the list. The decline is much sharper than had been anticipated by dealers. No. 1 heavy melting is quoted at $38, off $4; No. 2 heavy melting, $32, down $6; No. 1 bundles, $37, off $2; No. 2 bundles, $28, off $4. Machine shop turnings are off $1 at $17, and No. 1 cupola cast is down $4 at $46.

San Francisco—Steel scrap prices opened the new month at the same level as they ended in March. There is some pressure in the market for higher prices, but mill inventories are substantial, and incoming tonnage is plentiful.

Seattle — The scrap market is steady here. Exporters are again showing interest in tonnage, and business is being closed with Japan in good volume. While receipts are not so heavy as when prices were at the peak two months ago, shipments are ample for current requirements. Heavy melting is quoted at $39 for No. 1 and $35 for No. 2.

Ferroalloys . . .

Ferroalloy Prices, Page 180

Standard ferromanganese prices have been advanced $10 per ton, effective Apr. 1. The base price per net ton now is $215, f.o.b. furnace. Higher prices also have been effected on spiegeleisen and various manganese alloys.

Production and shipments of silicon alloys during 1955 gained 25 per cent and 47.5 per cent, respectively, over 1954, reports the U. S. Bureau of Mines. Apparent consumption (shipments from domestic furnaces, plus imports, minus exports) was 47 per cent above the 1954 figure.

Total shipments of silvery iron, ferrosilicon, silicon briquettes, silicon metal and miscellaneous silicon alloys last year were 933,063 tons. Imports totaled 24,359 tons; exports, 1689 tons; and apparent consumption, 955,733 tons.

Imports of ferrosilicon last year were 37 per cent higher than in 1954, containing 5963 short tons of silicon, valued at $1,992,885. Except for small quantities from Norway and Japan, all imports of ferrosilicon came from Canada. Exports were 19 per cent below those in 1954, and were valued at $308,033. The bulk of exports went to Mexico, Canada, United Kingdom and Cuba.

Iron Ore . . .

Iron Ore Prices, Page 182

A cargo of 9000 tons of Liberian iron ore was shipped from Cleveland to the Ford Motor plant at Detroit last week to bridge a shortage. Originally, the ore was shipped from Baltimore to Cleveland by rail. Shortages are not uncommon at many blast furnaces just prior to the opening of the Great Lakes navigation season.

The Orinoco Mining Co., subsidiary of U. S. Steel Corp., recently published in Caracas (Venezuela) newspapers a new price for its iron ore. The price is equivalent to $0.112894 per gross ton natural iron unit, f.o.b. hold of vessel, Puerto Ordaz, Venezuela. It is firm for all buyers taking delivery in the 12-month period commencing Apr. 1, under contract arrangements with Orinoco Mining Co.

The ore is high grade hematite, and specifications call for 63.0 per cent iron by dry analysis, with 58 per cent natural iron content.

Kaiser Steel Corp. has obtained rights to perform exploratory work on several iron mining claims of Bessemer Mines Inc., 30 miles east of Lucerne Valley, Calif. Kaiser will explore the claims and determine if they are worthwhile by Feb. 14, 1957. Lease arrangements call for up to a 15-year period during which Kaiser would pay from 15 to 50 cents a ton for ore shipped, depending on the ore content of each shipment. Minimum monthly payments of $1750 will be made during the lease.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 182

An increase of at least $1 per ton is expected to be effected generally on metallurgical coke. One eastern producer early last week put its prices up by that amount to $19.50, ovens, and other sellers were thought likely to take similar action. Doubt exists whether similar action will be taken on oven foundry coke.

Higher coke prices follow an increase of 10 cents per hour in bituminous miners' wages, effective Apr. 1, bringing their basic hourly wage rate to $2.61. Mine operators increased coal prices an average of 25 cents per ton in Pennsylvania, West Virginia and Ohio.

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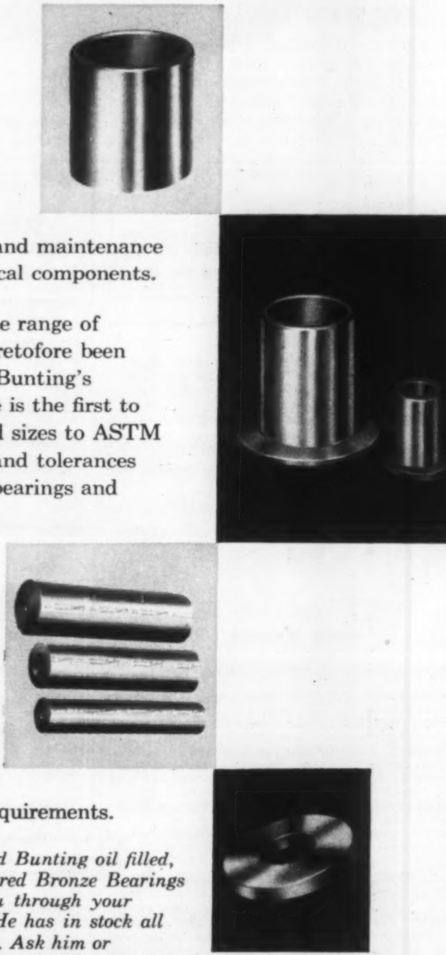

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Advertising Index

Aetna-Standard Engineering Co., The .... Inside Back Cover
Ajax Electrothermic Corporation 124
Allegheny Ludlum Steel Corporation 89
Allis-Chalmers .... Inside Front Cover
Alloy Metal Wire Division, H. K. Porter Company, Inc. 138
Alter Co., Alloy Metal Division 160
Aluminum Company of America 16
American Broach & Machine Co., A Division of Sundstrand Machine Tool Co. 17
American Chain & Cable, Campbell Machine Division 99
American Gas Furnace Co. 91
American MonoRail Co. 103
American Screw Co. 20, 45
American Smelting & Refining Co., Federated Metals Division 167
American Steel & Wire Division, United States Steel Corporation 29
American Welding & Manufacturing Co., The 58
Atlantic Screw Works, Inc. 45
Atlas Car & Mfg. Co., The 10

Bailey, William M., Co. 121
Baker-Raulang Co., The 3
Barnes, W. F. & John, Automation Section 25
Bethlehem Steel Co. 1
Birdsboro Steel Foundry & Machine Co. 150
Blake & Johnson Co., The 45
Bower Roller Bearing Division, Federal-Mogul-Bower Bearings, Inc. 155
Brad Foote Gear Works, Inc. 102
Bridgeport Brass Co. 165
Browning, Victor R., & Co., Inc. 184
Bunting Brass & Bronze Co., The 190

Cadman, A. W., Mfg. Co. 184
Campbell Machine Division, American Chain & Cable 99
Carborundum Co., The, Refractories Division 153
Carlson, G. O., Inc. 192
Carpenter Steel Co., The 40
Central Foundry Division, General Motors Corporation 22
Central Screw Co. 45
Chicago Rawhide Manufacturing Co., Sirvene Division 73
Cincinnati Cleaning & Finishing Machinery Co., The 85
Cincinnati Milling Machine Co., The 74
Cities Service Oil Co. 97
Clark Controller Co., The 82
Clearing Machine Corporation, Division of U. S. Industries, Inc. 141
Cleveland Hotel 6
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 163
Climax Molybdenum Co. 119
Colorado Fuel & Iron Corporation, The 37, 100, 101
Columbia-Geneva Steel Division, United States Steel Corporation 29
Continental Screw Co. 45
Cowles Tool Co. 102
Crucible Steel Company of America 145

De Laval Steam Turbine Co. 98
Detroit Steel Corporation 62
Diamond Manufacturing Co. 184
Dow Chemical Co., The 139
Du Pont, E. I., de Nemours & Co., Inc. 31

Eastern Machine Screw Corporation, The 184
Easton Car & Construction Co. 174
Edgewater Steel Co. 105
Elastic Stop Nut Corporation of America 147
Elco Tool & Screw Corporation 45
Electro Manganese Corporation 84
Electro Metallurgical Co., A Division of Union Carbide & Carbon Corporation 8

Fafnir Bearing Co., The 110
Federal-Mogul-Bower Bearings, Inc., Bower Roller Bearing Division 155

Federated Metals Division of American Smelting & Refining Co. 167
Freeway Washer & Stamping Co. 184

Gardner-Denver Co. 50
Garlock Packing Co., The 32
Gates Rubber Co., The 109
General American Transportation Corporation, Parker-Kalon Division 24, 45
General Electric Co. 106, 107
General Motors Corporation, Central Foundry Division 22
George & Dix 189
Gisholt Machine Co. 42, 43
Great Lakes Screw Corporation 45
Great Lakes Steel Corporation 78
Gregory Industries, Inc., Nelson Stud Welding Division 154

Handy & Harman 148
Hanna Furnace Corporation, The 176
Hannifin Corporation 185
Harbison-Walker Refractories Co. 51
Harper, H. M., Co., The 45
Harrington & King Perforating Co., The 93
Haynes Stellite Co., A Division of Union Carbide & Carbon Corporation 56
Heppenstall Co. 86
Holcroft & Co. 151
Hough, Frank G., Co., The 41

Illinois Gear & Machine Co. 11

Johns-Manville 92
Jones & Lamson Machine Co. 54, 55
Jones & Laughlin Steel Corporation 135

Kearney & Trecker Corporation, Walker-Turner Division 152
Kennametal, Inc. 142

Lake Erie Engineering Corporation 30
Lamson & Sessions Co., The 45
Landis Machine Co. 7
Landis Tool Co. 14, 15
Leeds & Northrup Co. 57
Linde Air Products Co., A Division of Union Carbide & Carbon Corporation 38, 47
Loftus Engineering Corporation 21
Luria Brothers & Co., Inc. 187

Magnaflux Corporation 64
Manning, Maxwell & Moore, Inc. 104
Massachusetts Department of Commerce 96
Mattison Machine Works 33, 34, 35, 36
May-Fran Engineering, Inc. 156, 157
Micromatic Hone Corporation 52
Mississippi Agricultural & Industrial Board 177

National Carbon Co., A Division of Union Carbide & Carbon Corporation Between Pages 16 and 17
National Machinery Co. 149
National Lock Co. 45
National Malleable & Steel Castings Co. 140
National Screw & Manufacturing Co., The 45
National Steel Corporation 78, 176
National Tube Division, United States Steel Corporation 29
Nelson Stud Welding Division of Gregory Industries, Inc. 154
Niagara Machine & Tool Works 26, 27
Norgren, C. A., Co. 144
North Carolina Department of Conservation & Development 12
Norton Co. 13

Ohio Crankshaft Co., The 2

Parker-Kalon Division, General American Transportation Corporation 24, 45
Pennsylvania Salt Manufacturing Co. 46
Pheoll Manufacturing Co. 45
Pittsburgh Lectromelt Furnace Corporation 28
Pittsburgh Metallurgical Co., Inc. 189
Pittsburgh Steel Co. 94, 95
Pollock, William B., Co., The 44
Porter, H. K., Company, Inc., Alloy Metal Wire Division 138
Porter, H. K., Company, Inc., The Riverside Metal Co. Division 158

Reliance Steel Division, Detroit Steel Corporation 62
Republic Steel Corporation 48, 49
Riverside Metal Co. Division, The, H. K. Porter Company, Inc. 158
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 37
Rolock, Inc. 146
Ryerson, Joseph T., & Son, Inc. 61

Scovill Manufacturing Co. 45
Screw Research Association 45
Service Steel 184
Seymour Manufacturing Co., The 5
Shakeproof Division Illinois Tool Works 45
Simonds Gear & Mfg. Co., The 191
Snyder Tool & Engineering Co. 18, 19
Sonken-Galamba Corporation 189
Southington Hdwe. Mfg. Co. 45
Square D Co. 129
Steel Shot Producers, Inc. 188
Sterling Bolt Co. 45
Sterling Grinding Wheel Co. 39
Struthers Wells Corporation, Titusville Forge Division 178
Sundstrand Machine Tool Co., American Broach & Machine Co. Division 17
Sun Oil Co., Industrial Products Department 9
Swedish Crucible Steel Co. 189

Tennessee Coal & Iron Division, United States Steel Corporation 29
Thomas Flexible Coupling Co. 179
Timken Roller Bearing Co., The, Steel & Tube Division Back Cover

Ulbrich Stainless Steels 108
Union Carbide & Carbon Corporation, Electro Metallurgical Co. 8
Union Carbide & Carbon Corporation, Haynes Stellite Co. 56
Union Carbide & Carbon Corporation, Linde Air Products Co. 38, 47
Union Carbide & Carbon Corporation, National Carbon Co. Between Pages 16 and 17
United Engineering & Foundry Co. 159
United States Rubber Co., Mechanical Goods Division 131
United States Steel Corporation, Subsidiaries 29
United States Steel Export Co. 29
United States Steel Supply Division, United States Steel Corporation 29
U. S. Industries, Inc., Clearing Machine Corporation Division 141

Veeder-Root, Inc. 4
Verson Allsteel Press Co. 81
Virginia Electric & Power Co. 23

Wales-Beech Corporation 45
Walker-Turner Division, Kearney & Trecker Corporation 152
Ward Steel Co. 185
Washburn Wire Co. 53
Wheland Co., The 6
Wilson Welding Co., Inc. 126, 127

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Table of Contents, Page 5

Classified Advertising, Page 189

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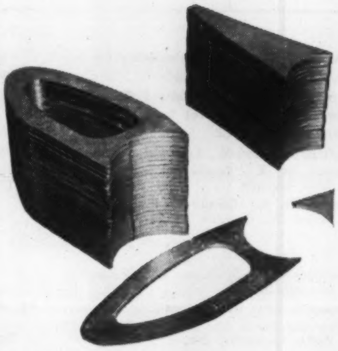

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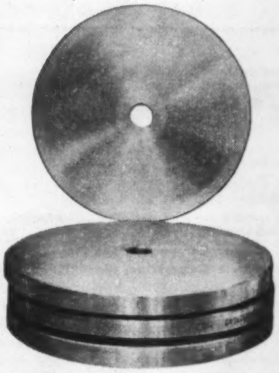

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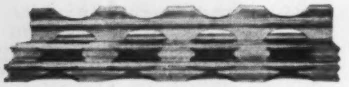

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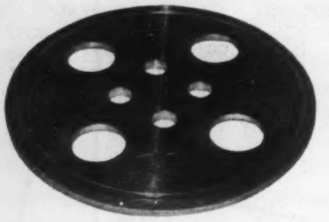

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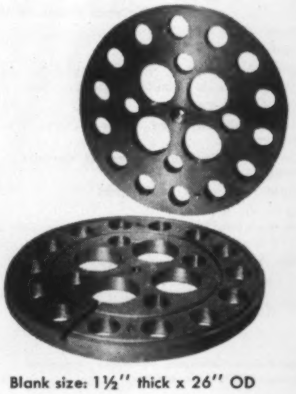

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